



## Assessment of Mother's Knowledge about Infant Oral Health Care, Oral Health Status and its Impact on Child's Oral Health: A Cross Sectional Study

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### Abstract

**Background and Objectives:** To carry on with any preventive procedures it is advisable to go for the approach 'known to unknown.' Focusing on Infant Oral Health Care (IOHC) this cross-sectional study aimed at assessing the maternal knowledge regarding infant oral health care, mothers' oral hygiene and its impact on child's oral hygiene. The objective is to see if there is any correlation between mothers' infant oral health knowledge and mothers' oral hygiene status with child's oral hygiene status.

**Methods:** 330 Pediatric dental patients below 6 years and the mothers of these children were selected using a convenient sampling technique were considered in the study.

**Statistical Analysis:** Spearman's correlation coefficient is used to find the correlation among various parameters.

**Results:** The results of the current study reveals that there is an increase in knowledge among mothers regarding oral hygiene aids, but there is a lack of knowledge regarding feeding practices, diet, oral hygiene practices, and first dental visit.

**Conclusion:** The study concludes that better maternal education, better the knowledge regarding infant oral health care, and oral hygiene. Better the oral hygiene status of the mother, lesser the caries index in mother, better oral hygiene and lesser the caries prevalence seen in children

**Keywords:** Infant Oral Health Care; Maternal Knowledge; Child's Oral Health

### Introduction

Parents' attitudes and knowledge regarding infant oral health care can have an influence on child's oral hygiene and health. Conventionally it is believed that learning begins since birth and mothers are the first and best teachers [1]. Healthcare professionals must assess and understand the amount of correct information, attitude, and practice regarding child's oral health that parents have, especially mothers. Though some studies showed the association between the knowledge, attitudes, and practices regarding infant

oral health care among mothers, there is a very little literature that assessed the education of mothers, their knowledge on infant oral health care, their oral health status, and correlating it with the oral health status of the young ones.

### Methodology

A cross-sectional descriptive study including pediatric patients below 6 years and the mothers of these children visiting OPD, conducted in the Department of Pediatric and Preventive Dentistry,

SDM College of Dental Sciences and Hospital, a constituent unit of Shri Dharmasthala Manjunatheshwara University, Dharwad. The sample size is measured using the Raosoft online calculator (Raosoft). To achieve a confidence level of 95% and 5% margin of error (Statistical significance), a minimum sample size (n) of 330 mothers and 330 children was considered and samples were selected through convenient sampling technique.

Inclusion criteria includes mothers of children below 6 years of age, who completed 7<sup>th</sup> standard and above with no other associated medical conditions. Children who were < 6 years of age with no other associated medical conditions were included. Exclusion criteria includes mothers who completed 7<sup>th</sup> standard and above but were not willing to participate in the study Children above 6 years of age. Ethical clearance was obtained for the present study.

Informed consent was taken from the study subjects who were willing to participate in the study. The questionnaire used for the study included 23 questions, arranged in 2 parts: Five questions related to demographic details of the mother were included in the first part. The second part included questions related to infant oral health care.

All the subjects were interviewed by the principal investigator and oral examination was done on the dental chair with a mouth mirror and explorer under natural light (ADA Type 3 examination method). The caries status was assessed by using DMFT index (WHO criteria 1999 for dental caries) [2], and oral hygiene was assessed by plaque index (Silness and Loe, 1964) [3]. Spearman's correlation coefficient, student t-test, are used to assess the correlations.

Q.no	Question	Right answer	Percentage	Wrong answer	Percentage
6	Was your child bottle-fed in the first 3 years?	152	46.1	178	53.9
7	Did your child have the habit of sleeping with a bottle/breastfeeding while sleeping?	116	35.2	214	64.8
8	Did you add sugars in milk while bottle-feeding or any other sugar substitutes like cerelac?	159	48.2	171	51.8
9	Did you start cleaning your infants’ gums before the teeth erupt?	35	10.6	295	89.4
10	When did you start cleaning your child’s mouth?	47	14.2	283	85.8
11	How frequently did you clean your child’s mouth?	123	38.5	203	61.5
12	When does an infant’s first tooth erupt in the mouth?	204	61.8	126	38.2
13	When should an infant’s first dental visit be scheduled?	47	14.2	283	85.8
14	Are you aware of the ways to soothe the painful gums while teething?	92	27.9	238	72.1
15	Taking care of your infant’s teeth is as important as any other part of the body?	256	77.6	74	22.4
16	How do you clean your child’s teeth?	309	93.6	21	6.4
17	Do you use a toothbrush and toothpaste to clean a child’s teeth?	313	94.8	17	5.2
18	Do you use any specialized kinds of toothpaste?	170	51.5	160	48.5
19	If yes, is it fluoridated?	126	38.2	204	61.8

20	Is it possible to prevent tooth decay?	212	64.2	118	35.8
21	Are you aware that some children’s teeth erupt at birth?	93	28.2	237	71.8
22	Should the infants’ oral checkup be done once in 6 months?	271	82.1	59	17.9
23	Would you like to receive more information about an infants’ oral health care?	309	93.6	21	6.4

**Table 1:** Assessment of maternal knowledge regarding infant oral health care.

		Education	Occupation	Total	def	OHIS-C	DMFT	OHIS-A
Education	Correlation Coefficient	1.000	0.332**	0.568**	-0.268**	-0.283**	-0.243**	-0.361**
	Significant. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
Occupation	Correlation Coefficient		1.000	0.304**	-0.086	-0.099	-0.104	-0.117*
	Significant. (2-tailed)			0.000	0.117	0.072	0.060	0.034
Total	Correlation Coefficient			1.000	-0.373**	-0.448**	-0.285**	-0.411**
	Significant. (2-tailed)				0.000	0.000	0.000	0.000
def	Correlation Coefficient				1.000	0.597**	0.481**	0.475**
	Significant. (2-tailed)					0.000	0.000	0.000
OHIS-C	Correlation Coefficient					1.000	0.363**	0.472**
	Significant. (2-tailed)						0.000	0.000
DMFT	Correlation Coefficient						1.000	0.356**
	Significant. (2-tailed)							0.000
OHIS-A	Correlation Coefficient							1.000
	Significant. (2-tailed)							

**Table 2:** Assessment of correlation among various parameters that is the educational status of the mother, occupation, total knowledge scores of the mother, and mothers’ oral hygiene status, with oral hygiene status of the child.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

	Was your child bottle-fed in the first 3 Years?	n	Mean	t-Value	p-Value
def	Wrong answer	178	8.8011	5.6	.00
	Correct answer	152	5.6118		
OHIS-C	Wrong answer	178	1.9053	5.7	.00
	Correct answer	152	1.3371		
DMFT	Wrong answer	178	5.6421	4.2	.00
	Correct answer	152	4.0204		
OHIS-A	Wrong answer	178	2.4302	4.5	.00
	Correct answer	152	1.8917		

**Table 3:** Assessment of the maternal knowledge for the question “Was your child bottle-fed in the first 3 years?”.

	Did your child have the habit of sleeping with a bottle/breastfeeding while sleeping?	n	Mean	t-Value	p-Value
def	Wrong answer	214	8.6650	6.5	.00
	Correct answer	116	4.8733		
OHIS-C	Wrong answer	214	1.8895	6.8	.00
	Correct answer	116	1.1900		
DMFT	Wrong answer	214	5.4505	3.9	.00
	Correct answer	116	3.8707		
OHIS-A	Wrong answer	214	2.3730	4.3	.00
	Correct answer	116	1.8301		

**Table 4:** Assessment of the maternal knowledge for the question “Did your child have the habit of sleeping with bottle/breastfeeding while sleeping?”.

			When should an infants’ first dental visit be scheduled		Total
			Wrong answer	Correct answer	
Education	7 <sup>th</sup> to 10 <sup>th</sup> standard	N	66	4	70
		%	94.3%	5.7%	100.0%
	11 <sup>th</sup> and 12 <sup>th</sup> standard	N	63	9	72
		%	87.5%	12.5%	100.0%
	Diploma and Bachelor	N	108	22	130
		%	83.1%	16.9%	100.0%
Masters and Ph.d	N	46	12	58	
	%	79.3%	20.7%	100.0%	
Total		N	283	47	330
%			85.8%	14.2%	100.0%

**Table 5:** Assessment of maternal knowledge for the question “when should an infants’ first dental visit be scheduled?”.

**Results**

Table 1 shows that there is an increase in the knowledge among mothers of children below 6 years of age regarding oral hygiene aids, but there is a lack of knowledge regarding feeding practices, diet, oral hygiene practices, first dental visit and on certain conditions like teething natal and neo-natal oral health care, oral hygiene. Table 2 reveals better maternal education, better the knowledge regarding infant oral health care. Better the maternal education,

lower the def scores of the child. There is not much statistically significant difference seen between maternal education and the oral hygiene status of the child. Better the maternal education, lower the DMFT scores of the mother. There is not much statistically significant difference seen between maternal education and her oral hygiene status. Table 3 shows children who did not have the habit of bottle feeding in the first 3 years showed statistically significantly fewer score in their def, OHIS- C values. Table 4 reve-

als that children who did not have the habit of bottle-feeding or breastfeeding in the night showed a statistically significant less def and OHIS scores than those with the habit. Table 5 shows overall 85.8% of mothers are not aware of the timing for scheduling their child’s first dental visit.

### Discussion

As per the American Academy of Pediatric Dentistry guidelines an opportunity for the prevention of oral diseases for a lifetime can be achieved by thorough knowledge on and practice of Infant oral health habits [4]. Dental caries is a multifactorial disease and one of the most prevalent diseases worldwide [5,6]. Early childhood caries is a bacterial mediated, sugar driven, multi-factorial dynamic disease. There is phasic demineralization and remineralization of dental hard tissues [7].

Parents' attitudes and knowledge regarding infant oral health care might influence a child’s oral hygiene. Studies also emphasized on the potential of mothers to play a significant role in the oral hygiene of their children and it should be kept while developing oral health promotion programs [8]. The European Journal of Pediatric Dentistry in the year 2019 released guidelines on perinatal oral health focusing on mothers. The role of mother has been emphasized concerning a child’s oral hygiene habits and status Astrom, 1998 [9]. Okada., *et al.* 2002 [10]. Some studies showed Mothers' oral hygiene knowledge and practice had an impact on the oral hygiene status of their 12-year-old children [11]. Other studies showed that the association between knowledge, attitudes, and practices regarding infant oral health care among mothers, but there is very little literature aiming at the current study. So, the current study aimed at assessing the educational status of the mothers, their knowledge, and oral hygiene status and correlating it with the oral hygiene status of their kids. The study design is shown in figure 1.

Demographic distribution of the population visiting the study area based on the maternal education shows an education level of masters or Ph.D (17.6% ) diploma or degree(39.4%), up to 11<sup>th</sup> and 12<sup>th</sup> standard (21.8%), up to 7<sup>th</sup> - 10<sup>th</sup> standard(21.2%). This distribution can be compared to one of the studies done in Kerala no illiterate mothers were found, 17.3% had college education while 58.6% had school only and 24.1% had higher secondary education [12]. Another study in Japan categorized mothers based on maternal education into illiterate, middle and secondary education, and third group into Senior secondary, graduate, and above [13]. Another study in Udaipur categorized into postgraduate or graduate

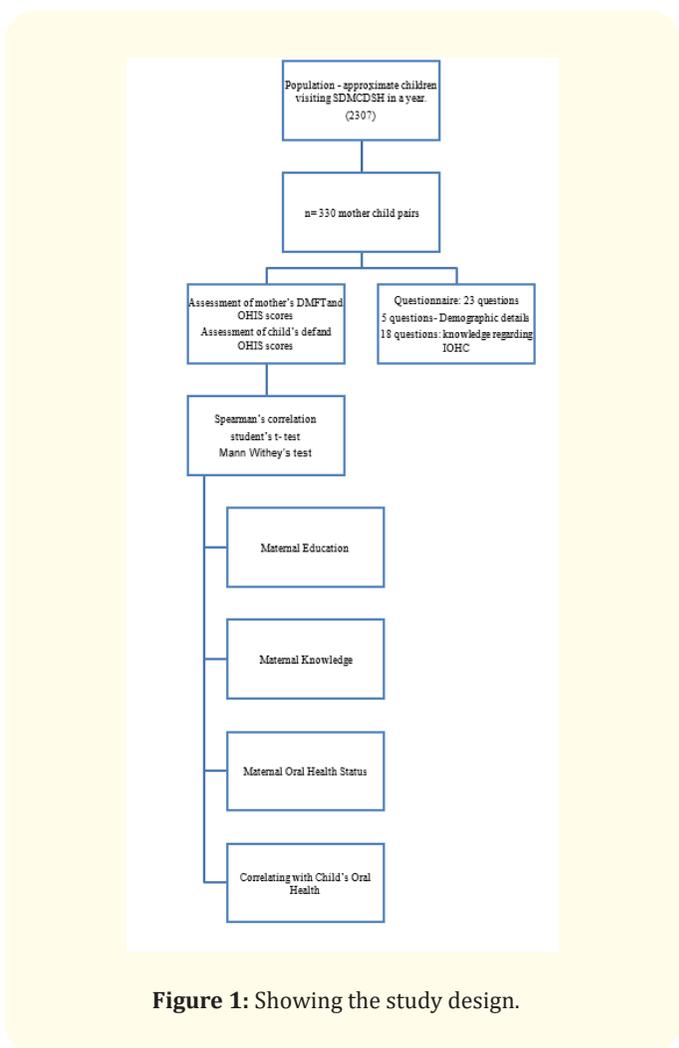


Figure 1: Showing the study design.

group, intermediate or post-high school diploma, high school certificate, middle school certificate, primary school certificate [14].

On assessing the maternal knowledge regarding infant oral health care, 53.9% of mothers have the habit of bottle feeding their child. In the current study children who did not have the habit of bottle feeding in the first 3 years showed statistically significant less scores in their def (5.6), OHIS-C (1.3) values. The results of this study are by the study done in Japan where 69.6% have the habit of bottle feeding for more than 12 months [15]. Bottle feeding was reported by 8.9% in a study by Anup Nagraj, which was contradictory to the findings by Tyagi R [16]. in which bottle feeding was practiced in 51% of children. 64.8% of children have the habit of sleeping while bottle-feeding or breastfeeding at night. The present study revealed children who did not have the habit of bottle-feeding or breastfeeding in the night showed a statistically significant less

def (4.8) and OHIS scores (1.1) than those with the habit (def- 8.7, OHIS- 1.9). Breastfeeding in the first year of a child's life is beneficial, however, a habit beyond 12 months especially nocturnal and frequent is associated with ECC [17]. The present study reports 51.8% of mothers added sugars or sugar substitutes in the bottle of milk and children who did not have the habit of adding sugars or any other sugar substitutes in the milk tend to show a lesser def (6.1) and OHIS-C (1.3) scores than those with the habit (def- 8.4, OHIS-C- 1.9). Recent studies in the year 2015 and 2018 concluded that the age at which sugars are introduced to the child and the consumption frequency are two key factors for infant dietary practices [18,19]. In the year 2017 it was also recommended that sugars in food and drink should be avoided by children under 2 years [20].

Cleaning with a finger was practiced by 28.82% only and 38.5% of mothers cleaned their child's mouth twice or thrice daily. The study conducted by Elena and Petr [21]. showed that 57% of the mothers brushed their children's teeth at least twice a day whereas other studies showed only 17.6% of mothers clean their teeth twice a day [11]. 61.8% mothers were aware that the first tooth erupts by around 6-12 months of age which is by the other studies (67%) [13]. Only 14.2% of mothers were aware that infants first visit should be carried as soon as the first tooth erupts or before 1 year of age. Overall 85.8% of mothers were not aware of the timing for scheduling their child's first dental visit emphasizing the lack of knowledge. The results of this study can be compared to a study done in Jaipur, where mothers again showed poor knowledge (26%).

As per the results of the current study, only 27.9% of mothers were aware of the ways to soothe the painful gums while teething. The results of the current study are in comparison with the results of a study done in Saudi Arabia, Egypt, and Jaipur, where many mothers had poor knowledge about teething [22,23,13].

The current study also tried to find the correlations among various parameters using spearman's correlation coefficient. The maternal education was shown as a strong influencing factor on a child's oral health. A statistically significant difference was found between the mothers' education status and her knowledge about oral health. Improved level of education may be able to access the appropriate sources of information and understand that information more fully and completely [24]. As the education of mothers increased, their children showed good oral health status. It was similar to studies conducted by Hashim R., *et al.* [25]. P Sudha,[26]. Eissa

Al-Hosani., *et al.* [27]. Rao A,[28]. Babu Jose,[29]. S.C.L. Chan,[30]. R.S. Naidu,[31]. Franciszek Szatko,[32].

There is a significant negative correlation seen in the current study between maternal education and maternal and child oral hygiene and dental caries indices. ANOVA test reveals better maternal education, lower the def scores of the child. However, a def score of 5.91 among mothers with higher education is still alarming, could be because of the effect of various other factors for dental caries possibly could be because of the socioeconomic status, less awareness and less knowledge regarding importance of primary teeth. This necessitates the need for more awareness. The results of the study can be compared to the mean def values which were  $3.20 \pm 3.20$  Lower def values were observed in earlier studies conducted in Pelotas, Brazil (3.20),[33]. Moodbidri (3.48),[28]. Chandigarh (4.0),[34]. North and West Belfast (3.81),[35]. Hubli-Dharwad ( $2.70 \pm 3.57$ ),[36]. Ajman (4.4),[25]. and Kerala ( $2.5 \pm 0.96$ ) [37].

There is a statistically significant difference seen between maternal education and the oral hygiene status of the child. Better the maternal education, lower the def scores of the child. However, a def score of 5.91 among mothers with higher education is still alarming, could be because of the effect of various other factors for dental caries and it necessitates the need for more awareness There is a statistically significant difference seen between maternal education and her oral hygiene status. However, a child's untreated caries status is associated only with high levels of maternal untreated caries [38]. Mothers' caries status was related to preschool children's caries status in Thailand,[39]. and New York [40]. However it was not significant in a Japanese study [41]. in Finland [42].

Improved level of education may be able to access appropriate sources of information and understand that information completely. A statistically significant association was seen between the mothers knowledge, attitude, practices about oral hygiene and caries prevalence, mean DMFT, and plaque score.

Critical evaluation includes further studies can be carried out assessing knowledge including fathers and caregivers, expected mothers considering their access to various preventive and therapeutic procedures. To eliminate the possible Berkson's bias that is usually associated with studies that are carried in a hospital setup, more population involving the general public can be carried out.

Limitations of the study includes mothers with education below the 7<sup>th</sup> standard were not considered in the study. The possibility of

Berkson's and interviewer's bias. Number of siblings and socio-economic status of the family is not considered.

### Conclusion

A high def scores necessitate a need for the generation of more awareness regarding infant oral health care which can be established by establishment of dental home. The results of the study show that better the oral hygiene of mothers, better the oral hygiene of the child suggesting the necessity for planning more infant oral health care programs keeping mothers oral health prenatal, natal and post nataly. The establishment of a dental home might increase the knowledge regarding infant oral health care.

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