



Original article

Rural–urban disparities in knowledge, attitude, and practice toward child oral health among mothers of 9–36-month-old children

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Abstract

Objective: To assess and compare the knowledge, attitude, and practice of mothers of pre-school children in urban and rural areas toward maintaining child oral health.

Materials and Methods: A cross-sectional comparative study was conducted in a convenient sample of 400 mothers of pre-school children (aged 9 months to 3 years) visiting the outpatient department of the Department of Dentistry, Shyam Shah Medical College, Rewa (M.P), India between February 1 and April 21, 2022. The study sample was divided into two groups based on whether they belonged to a rural area (Group A) or urban area (Group B). Group A included 236 participants, and Group B 186 participants. They were served a 24-item questionnaire to assess and compare their knowledge, attitude, and practice toward child oral health. The data were represented as mean and proportions, and a student t test and analysis of variance were performed.

Results: In Group A and Group B, 93.64% and 98.17% mothers respectively had the knowledge of cariogenic food. While 66.10% of mothers in Group A and 73.78% in Group B were aware that regular cleaning of teeth protects against tooth decay, only 5.49% of mothers in Group B and none in Group A reported taking their children to routine dental visits; the majority (94.07% in Group A and 78.05% in Group B) had never taken their children to the dentist. Urban background was significantly associated with better knowledge, attitude, and practice scores. Mother's age and education level were significantly associated with better Knowledge, Attitude, and Practice scores in both groups.

Conclusion: Mothers can play an important role in promoting positive attitudes and healthy practices toward oral health care in children. Knowledge, attitude, and practice score were found to be significantly low in mothers who belonged to the rural subgroup.

Key words: maternal attitude, maternal knowledge, maternal practice, rural area, urban area

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Introduction

Dental caries and oral health problems in primary dentition can have significant deleterious effects on children's growth. Mothers are the primary caregivers in early childhood and hence they play an important role in the development of their health behavior. The low level of mothers' oral

health knowledge is correlated with their children's poor oral health¹). Ignorance of preventive oral health measures for the child, inappropriate breast and/or bottle feeding practices and weaning beyond the recommended age by the mother predisposes to early childhood caries²). The societal costs of early childhood caries pose a serious health problem, and more than 90% of dental caries remains untreated due to financial constraints^{3, 4}). People residing in rural area have restricted access and utilization of preventive and curative oral health care services because of geographic, economic, and cultural barriers that negatively affect oral health⁵). Emphasis is laid on early dental visits of infants as advocated by the American Academy of Pediatric Dentistry (AAPD), which will carve a way for educating parents about good oral hygiene, the importance of deciduous teeth, risk factors, and the etiology of dental diseases^{6, 7}).

The positive oral health behavior of mothers of urban

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and rural areas will lead to the development and consolidation of positive attitude toward preventive oral health practices in the child, thereby decreasing the child's risk of chronic oral diseases and ameliorating the rural urban disparity regarding child oral health⁸). The basic step of any health promotion strategy is identifying problematic areas by assessing the knowledge, attitude, and practice levels of the community regarding it. This study was conducted with an aim to assess and compare the awareness, attitude, and perceptions of mothers of pre-school children toward maintaining child oral health in rural and urban areas of Rewa District, M.P, India.

Materials and Methods

This was a cross-sectional, questionnaire-based quantitative study aimed to assess maternal knowledge, attitude, and practice toward child oral health. The study was conducted in a non-probabilistic sample of 400 mothers of children (aged 9 months to 3 years), who visited the Department of Dentistry, Shyam Shah Medical College Rewa, M.P, India between February 1 and April 21, 2022. The inclusion criterion were mothers visiting the outpatient department (dentistry) for their own routine oral examination; or treatment of their own dental disease; or mothers who accompanied someone with a dental complaint (other than the child aged 9 months to 3 years), and they gave written consent for participating in the study.

Exclusion criteria were mothers who did not agree to participate or failed to participate in the interview. Ethical clearance was obtained from the institutional review board, and informed written consent was obtained from the participants. The study participants were divided into two groups (Group A-Rural and Group B-Urban) based on their residential address (according to the guidelines issued by Office of Registrar General, India dated 04.09.2018 as Rural Urban Classification for Census-2021 in "Census of India-2021 – Circular No.2")⁹.

A pre-designed, validated 24-item structured questionnaire of four sections was prepared by adaptation from previous studies^{6, 7, 10–12}. The questionnaire was prepared in English and translated to Hindi and pretested.

Section 1 procured information of the participants including mothers' age and education. Section 2 gathered information on 12 questions aimed at assessing maternal knowledge. Section 3 consisted of six questions toward maternal attitude, and the options were based on a modified Likert scale (i.e., agree, disagree, and uncertain). Section 4 consisted of six questions pertaining to mothers' practice toward maintaining their children's oral health.

The questionnaire was administered to 400 participants by a single investigator through face-to-face interview. For questions pertaining to Section 2 & 4 (maternal knowledge

and practice), a score of 1 was recorded for the correct answer and 0 for the incorrect answer. For Section 3 (attitude), correct responses were assessed from the responses provided (agree, disagree, and uncertain) and given a score of 1, whereas wrong responses were marked as 0. The knowledge scores ranged from 0 to 12, attitude scores from 0 to 6, and practice scores from 0 to 6, and the total score aggregated from 0 to a maximum of 24. The Knowledge Attitude Practice (KAP) score was graded as good when the respondents were able to answer more than 16 questions correctly, average when they answered between 9 and-16 answers correctly, and poor when they answered <9 questions correctly.

Statistical analysis

For descriptive statistical analysis, all variables were described as relative and absolute values. Frequency distribution tables, means, and standard deviations were used. Categorical variables were measured as percentages, while continuous variables were expressed as mean \pm standard deviation using Epi info version 7. An independent t test was used to compare the mean between the two groups and an analysis of variance (ANOVA) was used to determine relationship between mothers' knowledge, attitude, and practice scores and their age and education. A *P*-value of less than 0.05 was considered significant and <0.001 as highly significant.

Results

A total of 400 mothers who appeared for the interview were included in the study. Among 400 mothers, 236 (59%) were residents of a rural area and 164 (41%) of an urban area. In the rural subgroup (Group A), 46.61% of mothers belonged to the 25–35-year age group followed by 44.49% of mothers who were less than 25 years old. In the urban subgroup (Group B) 59.15% of mothers belonged to the 25–35-year age group (Table 1). Fifty-five (23.30%) mothers in Group A and 26 (15.85%) in Group B were illiterate. Only 7.62% of mothers in Group A were educated to the graduate level or higher whereas 19.51% in Group B were educated to the graduate level or higher (Table 2).

Knowledge: The majority of the mothers (63.98% in Group A and 69.51% in Group B) had the knowledge that cleaning of their children's teeth should begin when the first tooth erupts in the oral cavity. In Group A and Group B, 93.64% and 98.17% of mothers, respectively were aware of cariogenic food. The fact that prolonged breast feeding predisposes to dental caries was known to 13.14% of mothers in Group A and 37.80% of mothers in Group B. 73.31% of mothers in Group A and 75% in Group B had the knowledge that night time bottle feeding is detrimental (Table 3).

Attitude: In Group A and Group B, 43.22% and 69.51% of mothers, respectively agreed with the fact that oral health

Table 1 Group wise distribution of mothers according to age

Distribution of participants according to age (N=400)				
Age group (years)	Group A (N=236)		Group B (N=164)	
	N (%)	Mean ± SD	N (%)	Mean ± SD
<25	105 (44.49)	20.52 ± 1.42	45 (27.44)	23.04 ± 1.13
25–35	110 (46.61)	27.81 ± 2.53	97 (59.15)	27.46 ± 1.93
>35	21 (8.9)	36.43 ± 0.60	22 (13.41)	36.77 ± 0.81
Group mean age	25.33 ± 5.29		27.5 ± 4.44	

Table 2 Group wise distribution of mothers according to education and socio-economic status

Distribution of participants according to education (N=400)				
Education level	Group A (N=236)		Group B (N=164)	
	N	%	N	%
Illiterate	55	23.30	26	15.85
Up to middle school	107	45.33	65	39.63
Up to senior secondary school	56	23.72	41	25.00
Graduate and above	18	7.62	32	19.51

Distribution of participants according to socio-economic status				
Socio-economic status	Group A (N=236)		Group B (N=164)	
	N	%	N	%
I	21	8.89	33	20.12
II	22	9.32	23	14.02
III	29	12.28	17	10.36
IV	51	21.61	39	23.78
V	113	47.88	52	31.70

affects the patient's general well-being. In addition, 41.95% of mothers in Group A and 59.76% in Group B correctly believed that the bacteria implicated in dental disease causation can transmit from mother to child by close contact or by sharing feeding utensils (Table 4).

Practice: Only 34.75% of mothers in Group A and 51.83% of mothers in Group B started cleaning their children's teeth as soon as the first tooth erupted in the oral cavity. The use of a pacifier dipped in sweet liquid for the child was more prevalent among urban mothers (48.17%) in comparison with rural mothers (28.8%; Table 5).

The mean KAP score was poor for Group A with a mean of 8.68 ± 1.72 whereas the mothers of Group B had an average KAP score of 12.09 ± 1.91 . The difference in mean knowledge, attitude and practice scores between the two groups was statistically significant with $P=0.0001$ (Table 6).

The mean Knowledge Attitude and Practice scores were significantly associated with age and education in both groups (Tables 7 and 8).

Discussion

High caries prevalence was reported in children who were breast- or bottle-fed during the night or were fed for longer, or with additional sugar in the milk¹³. Most of the mothers were aware about the detrimental effects of nocturnal bottle feeding (73.31% in Group A and 75% in Group B), whereas the fact that prolonged breast feeding predisposes to dental caries was known to 13.14% of mothers in Group A and 37.80% of mothers in Group B. In their meta-analysis, Tham *et al.* included 63 papers on "breastfeeding and the risk of dental caries" and found that children breastfed for >12 months had an increased risk of caries and those fed nocturnally or more frequently had a further increased caries risk¹⁴.

The fact that brushing should start as soon as the first tooth erupts was known to 63.98% of mothers in Group A and 69.51% of mothers in Group B. The findings showed higher numbers in comparison to a study by Desai *et al.* (39%) conducted on 350 primigravida women in Navi Mum-

Table 3 Distribution of mothers in both groups according to correctly answered questions pertaining to knowledge

Section no	Questions pertaining to knowledge	Response	Correct response N (%)	
			Group A N=236 (%)	Group B N=164 (%)
1	When should the cleaning of child's teeth begin?	No later than when the first primary tooth erupts	151 (63.98)	114 (69.51)
		When all teeth erupt	85 (36.02)	50 (30.49)
2	Does sugary food, candies, pacifier dipped in sweet liquids cause caries?	Yes	221 (93.64)	161 (98.17)
		No	15 (6.35)	3 (1.83)
3	Does frequent snacking predispose to dental caries?	Yes	139 (58.90)	121 (73.78)
		No	97 (41.10)	43 (26.22)
4	When should cariogenic food be given to the child?	Between meals	135 (57.20)	47 (28.66)
		With meals	39 (16.52)	92 (56.10)
		At bedtime	62 (26.27)	25 (15.24)
5	Can prolonged nocturnal breast feeding cause dental caries?	Yes	31 (13.14)	62 (37.80)
		No	205 (86.86)	102 (62.20)
6	Is night time bottle feeding detrimental to children's oral health?	Yes	173 (73.31)	115 (70.12)
		No	63 (26.69)	49 (28.88)
7	Can regular cleaning of teeth protect against dental caries?	Yes	156 (66.10)	121 (73.78)
		No	80 (33.90)	43 (26.22)
8	Does the child toothpaste contain fluoride?	Yes	15 (6.36)	57 (34.76)
		No	221 (93.64)	107 (65.24)
9	Does fluoride tooth paste prevent tooth decay?	Yes	12 (5.09)	55 (33.54)
		No	224 (94.91)	109 (66.46)
10	What is the amount of toothpaste that should be applied for children under the age of 3 years?	Smear size/rice grain	62 (26.27)	61 (37.19)
		Peanut size	123 (52.12)	77 (46.95)
		Full length of the brush size	51 (21.61)	26 (15.85)
11	Do you know about pit and fissure sealants?	Yes	5 (2.12)	11 (6.71)
		No	231 (97.88)	153 (93.29)
12	Do you know that dental home should be established for the child within six months of eruption of the first tooth and no later than 12 months of age?	Yes	0	12 (7.32)
		No	(100)	152 (92.68)

The correct response is highlighted with bold.

Table 4 Distribution of mothers in both groups according to correctly answered questions pertaining to attitude

Section no	Questions pertaining to attitude	Correct response N (%)	
		Group A N=236 (%)	Group B N=164 (%)
1	Milk teeth are replaced by permanent teeth and do not require brushing.	137 (58.05)	133 (81.1)
2	Good oral health positively influences good overall health in an individual.	102 (43.22)	114 (69.51)
3	Do you feel anxious/ scared about dental consultation for your child?	123 (52.12)	104 (63.41)
4	The child should be taken for regular visits to the dentist.	107 (40.53)	102 (62.19)
5	Mothers should regularly brush child's teeth themselves.	135 (57.20)	104 (63.41)
6	Bacteria implicated in dental caries are transmissible from mother to child.	99 (41.95)	98 (59.76)

bai where despite being aware, only 34.75% of mothers in Group A and 51.83% in Group B practiced brushing for their infants with the eruption of first primary tooth¹⁵.

Transmission of mutans streptococcus from the mother or other intimate caregivers to the child is well documented

and the infant's risk of developing caries increases as the levels of salivary mutans streptococcus increases in mothers¹⁶. This way of transmission was known to 41.95% of mothers in Group A and 59.76% of mothers in Group B. However, Wakaguri *et al.* in their study on 3,035 children

Table 5 Distribution of mothers in both groups according to correctly answered questions pertaining to practice

Section no	Questions pertaining to practice	Response	Group A N=236 (%)	Group B N=164 (%)
1	Do you use pacifier dipped into sweet liquid for your child?	Yes	68 (28.81)	79 (48.17)
		No	125 (52.97)	42 (25.61)
		Sometimes	43 (18.22)	43 (26.22)
2	When did you commence the cleaning of your child's teeth?	With eruption of first tooth	82 (34.75)	85 (51.83)
		When more than one tooth erupted	75 (31.78)	52 (31.71)
		When all teeth erupted	79 (33.47)	26 (15.85)
3	How many times does your child brush his teeth?	Once in two/three days	63 (26.69)	29 (17.68)
		Once daily	130 (55.08)	97 (59.15)
		Two times or more	43 (18.22)	38 (23.17)
4	When do you take your child to a dentist?	On regular dental visits as scheduled by the dentist	0 (00)	9 (5.49)
		When the child suffered toothache	14 (5.93)	27 (16.46)
		Have never been to a dentist for the child	222 (94.07)	128 (78.05)
5	What do you do when your child complains of dental pain?	Take him to a dentist	61 (25.85)	105 (64.02)
		Give him medicines as prescribed by nearby medical store/peers/family	175 (74.15)	59 (35.98)
6	If a dentist suggests a treatment to save painful carious primary tooth will you get it done?	Yes	32 (13.56)	67 (40.85)
		No	204 (86.44)	97 (59.15)

The correct response is highlighted with bold.

Table 6 Comparison of mean knowledge, attitude and practice scores between two groups

	Group A (N=236) Mean ± SD	Group B (N=164) Mean ± SD	P-value
Knowledge	4.25 ± 1.15	5.99 ± 1.33	0.0001
Attitude	2.98 ± 0.81	3.99 ± 0.99	0.0001
Practice	1.45 ± 0.72	2.11 ± 0.84	0.0001
KAP score	8.68 ± 1.72	12.09 ± 1.91	0.0001

Independent t-test is used to analyse the data.

Table 7 Mean knowledge, attitude and practice scores of both groups according to age group

Age	Mean knowledge score		Mean attitude score		Mean practice score	
	Group A	Group B	Group A	Group B	Group A	Group B
<25	3.75 ± 1.17	4.98 ± 0.88	2.65 ± 0.71	4.18 ± 0.91	1.54 ± 0.77	2.35 ± 0.80
25–35	4.65 ± 1.02	6.61 ± 1.23	3.25 ± 0.83	4.06 ± 0.99	1.4 ± 0.68	2.07 ± 0.86
>35	4.67 ± 0.58	5.32 ± 0.87	3.19 ± 0.60	3.32 ± 0.89	1.29 ± 0.56	1.77 ± 0.68
P-value ANOVA	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001

Table 8 Mean knowledge, attitude and practice scores of both groups according to education

Education level	Mean knowledge score		Mean attitude score		Mean practice score	
	Group A	Group B	Group A	Group B	Group A	Group B
Illiterate	3.13 ± 0.84	4.54 ± 0.71	2.29 ± 0.68	3.08 ± 0.74	0.91 ± 0.48	1.04 ± 0.44
Up to middle school	4.08 ± 0.90	5.34 ± 0.64	2.87 ± 0.53	3.51 ± 0.75	1.25 ± 0.47	1.91 ± 0.68
Up to senior secondary school	5.30 ± 0.50	6.58 ± 0.77	3.45 ± 0.63	4.54 ± 0.64	2.04 ± 0.54	2.56 ± 0.50
Graduate and above	5.44 ± 0.85	7.72 ± 1.08	4.28 ± 0.65	5.03 ± 0.54	2.5 ± 0.71	2.81 ± 0.64
P-value ANOVA	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001

of child-caregiver pairs concluded that caregiver behavior to prevent vertical transmission was not effective in reducing the levels of childhood caries¹⁷). A total of 942 children (31.0%) experienced caries; out of 414 (13.6%) children whose caregivers practiced vertical transmission prevention, 111 (26.8%) children experienced caries and out of 2,621 (86.4%) children whose caregivers did not practice vertical transmission prevention 831 (31.7%) experienced caries. A significant association existed between behavior to prevent vertical transmission and the caries experience in the non-adjusted model. Multivariate logistic regression analysis with the variables of: children's gender and age in months, dietary variables, oral health behaviors and socio-demographic factors did not show any significant association between behavior to prevent vertical transmission and caries experience. It is proposed that the incidence of caries in children was significantly greater in the group that did not practice vertical transmission prevention behavior. This finding can also be attributed to the limitations of this study, namely that the levels of bacteria in the children and caregivers were not evaluated and that this was a cross-sectional study rather than a longitudinal study.

Knowledge of the preventive role of fluoride in toothpaste was inadequate and only 5.09% of mothers in Group A and in 33.54% in Group B were aware of it. This was low in comparison to the study by Mahmoud *et al.*, where 51.7% of mothers recognized the protective role of fluorides¹⁸). An intricate balance must be established regarding the age appropriate amount of fluoridated toothpaste (not more than a smear of toothpaste for children under 3 years of age and pea size amount for children aged 3–6 years), so that the benefits of preventing dental caries are not outweighed by the potential harm of fluorosis associated with ingesting fluoride toothpaste. The knowledge of the age-appropriate amount of fluoridated toothpaste was low in this study.

AAPD recommends that the child's dentition be seen within 6 months of first tooth eruption and no later than at 12 months of age for caries risk assessment, parental education, and anticipatory guidance⁷). However, in the current study, this concept was known to only 7.32% of mothers in Group B and none in Group A; moreover, only 5.49% of mothers in Group B and none in Group A actually took their child to the dentist on scheduled visits. The findings of this study were in accordance with the literature indicating that the use of oral health care service in India is mainly for pain relief^{19,20}). This can be attributed to poor knowledge of the importance of child oral health, apprehension regarding treatment, and financial and time constraints²¹). Fear about dental treatment was reported by 52.12% of mothers in Group A and 63.41% in Group B. Dental fear and anxiety is a common reason for avoiding dental treatment, which may result in deteriorated oral health overtime²²).

Better oral health-related trends for preschool children

were observed with older mothers in this study which was in contrast to the study by Ashkanani and Al-Sane., who reported better trends in the younger age group²³). Mothers with higher educational qualification had better knowledge, attitude and practices scores than those with a lower education level which echoed other studies^{23, 24}). It is suggested that an improved level of education guides an individual to assess appropriate sources of information and precisely understand that information²⁵).

The findings of the present study suggest that dental professionals should emphasize educating the women from pregnancy through orientation programs regarding preventive oral practices for children. Routine immunization visits can be utilized to emphasize the importance of early dental visits for infants. This may improve knowledge and lessen the knowledge–practice gap in mothers of preschool children regarding the importance of their children's oral health practices.

Limitation

Since this was a single institution-based study with limited sample size, the results cannot be generalized. Similar studies can be conducted in large populations to assess the awareness, attitude and perceptions of mothers regarding child oral health, and their implications can be ascertained by means of longitudinal studies that evaluate children's oral health status.

Conclusion

Mothers with an urban background had average KAP scores, while those with a rural background showed poor KAP scores regarding children's oral health. Pre-natal and post-natal care visits should be utilized to counsel mothers in both urban and rural areas regarding child oral health; moreover, community-oriented, comprehensive oral health promotion programs should be incorporated in public health campaigns run by central and state governments. These may benefit the residents of rural areas and the less educated population regarding preventive oral health practices for children from infancy and decrease the burden of oral health diseases.

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