

ORIGINAL ARTICLE

**EARLY CHILDHOOD CARIES AND INFANT ORAL HEALTH:
AWARENESS AND PERSPECTIVES OF DENTISTS
IN RAWALPINDI AND ISLAMABAD****Sana Jalil Hasan, Amber Rashid*, Dil Ruba**, Zeeshan Siddique***,
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Background: Early childhood caries is one of the most common dental issues affecting children worldwide. The objective of this study was to assess the knowledge and attitude of the dentists in the prevention and management of early childhood caries. **Methods:** This study was conducted at Margalla Institute of Health Sciences, Rawalpindi, from Dec 2021 to Jun 2022. Three hundred dentists from the twin cities of Rawalpindi/Islamabad were contacted using a questionnaire in a cross-sectional study about their concepts towards early childhood caries and infant oral health. Their responses were analysed on SPSS-21. **Results:** Out of 300 participants, 86 (28.7%) participants had excellent scores (>80%), 204 (68.0%) had average scores (61–79%), while 10 (3.3%) had poor score of their knowledge of infant oral health and early childhood caries. **Conclusion:** Majority of the dentists had adequate knowledge about the various aspects included in maintaining good oral hygiene.

Keywords: Early childhood caries, ECC, fluoride, infant oral health, IOH, preventive strategies

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INTRODUCTION

The overall health of human beings is dependent on different factors. Oral health plays a vital role in maintaining the general health. It is not only important for adults but also for children and infants.¹ Early childhood caries (ECC) is defined as multiple smooth surface carious lesions in children less than 3 years of age.² Early intervention provides improvement in oral health of children and also provides guidance to parents.³

As oral hygiene of an infant is dependent mainly upon the primary caregiver so it is important to educate the primary caregiver about the importance of infant oral health (IOH).⁴ Early childhood caries is also common among children whose parents and caretakers are ignorant of infant oral hygiene measures. It is a duty of a dentist to guide caretakers about these measures.⁵

In Pakistan, knowledge and attitude regarding oral hygiene and caries in children has been measured in mothers, teachers and primary caretakers but there is dearth of data regarding knowledge of dentists. This study was carried out to assess the knowledge and attitude of the dentists in prevention and management of early childhood caries.

METHODOLOGY

This cross-sectional study was conducted in the twin cities of Rawalpindi/Islamabad for a period of 6 months using a modified form of questionnaire⁶. After taking ethical clearance from the Ethical Review Committee of Margalla Institute of Health Sciences, Rawalpindi, 300 dentists were included from government and private

setup after obtaining their informed consent. In the first part of the questionnaire, questions were asked related to knowledge and concept about dental caries and its causes, caries transmission, role of fluoride, dental visits, oral hygiene, and timings of teeth eruption in children. The second part assessed the attitude of dentists regarding general IOH and ECC.

The collected data were entered into MS Excel worksheet and imported into SPSS-21 for analysis. Continuous variables were expressed as means with standard deviation or frequencies and percentages. Chi-square test was used to determine associations between categorical variables with $p \leq 0.05$ taken as significant. Twenty-three questions were included to assess the knowledge of the dentists. One (1) score was assigned for a correct response to a question while 0 was assigned for an incorrect response/‘do not know’/no response. The sum of scores was calculated for each participant. A score of $\geq 80\%$ was described as excellent knowledge, score between 61 and 79% was described as satisfactory, and $<60\%$ was described as poor knowledge.

RESULTS

Out of 300 dentists 123 (41.0%) were males and 177 (59.0%) were females, 177 (59.0%) belonged to age group 20–30 years followed by 100 (33.3%) in 31–40, while 23 (7.7%) in above 40 years age group. Regarding educational status, 221 were graduate and 79 had postgraduate education. Most of the responder had 1–3 years clinical experience. The baseline characteristics of the responders is summarized in Table-1.

Most (95.3%) of the dentists were aware of the fact that a child’s first tooth erupts at about 6–7 months

of age. Majority (77%) of the dentists were not sure about child's first visit to dentist before 1 year age. Sixty-six percent dentists were not aware about the age when a child should brush teeth unattended. Dentists had good knowledge regarding aetiology of dental caries; 96% agreed that refined sugars can cause dental caries and 99.7%) stated that fluoride in water or toothpaste makes teeth stronger and prevents dental caries. Only a few (21.7%) dentists knew that ECC is transmissible from mother to child.

The mean knowledge score for total responders was 16.6±1.91 out of 23 (Range: 11–21). There were 86 (28.7%) participants who scored excellent (>80%), 204 (68.0%) scored satisfactory (61–79%), while 10 (3.3%) had poor score (<60%).

In 14 out of 23 knowledge-based questions more than 80% of the participants answered correctly. For attitude-based questions, 125 (41.7%) responders did not have adequate knowledge regarding infant oral health. Two hundred and eighty-six (95.3%) were willing to enhance their knowledge on the subject. (Table-2).

Table-3 shows excellent, satisfactory and poor score categories with demographic characteristics. Knowledge improved with age, level of qualification and years of experience.

Table-4 shows a significant association between mean knowledge score and age ($p<0.001$), educational level ($p<0.001$), and years of clinical working experience ($p<0.001$), while there was insignificant association for gender. Responders aged >40 years scored highest in knowledge score. The responders with postgraduate qualification had significantly higher knowledge score as compared to those with graduate level qualification (17.4 ± 2.0 vs 16.3 ± 1.7 , $p<0.001$). It is evident that as the number of years of clinical experience increased, the knowledge score also increased.

Table-1: Baseline characteristics of study responders (n=300)

Characteristics	Frequency	Percentage
Age		
20–30 Years	177	59.0
31–40 Years	100	33.3
>40 Years	23	7.7
Gender		
Male	123	41.0
Female	177	59.0
Education level		
Graduate	221	73.7
Postgraduate	79	26.3
Clinical working experience		
1–3 Years	169	56.3
4–6 Years	54	18.0
>6 Years	77	25.7

Table-2: Summary of responses to knowledge and attitude questionnaire [n=300, n (%)]

Questions	Correct	Incorrect
Knowledge		
Is the mouth of a neonate free from bacteria?	261 (87.0)	39 (13.0)
At what age does the first tooth erupt?	286 (95.3)	14 (4.6)
When should a child go for the first dental visit?	68 (22.7)	232 (77.3)
How often should a child visit the dentist?	191 (63.7)	109 (36.3)
When should a mother start cleaning her child's teeth?	253 (84.3)	47 (15.6)
What should be used for cleaning baby's teeth?	161 (53.7)	139 (46.3)
What size of toothpaste should be placed on a child's toothbrush?	286 (95.3)	14 (4.7)
At what age should a child start unassisted brushing?	102 (34.0)	198 (66.0)
Can fluoride make teeth stronger?	299 (99.7)	1 (0.3)
Is dental caries preventable?	300 (100)	0 (0)
Do bacteria play a role in dental caries?	100 (100)	0 (0)
Can refined sugar cause dental caries?	289 (96.3)	11 (3.7)
Is dental caries a tooth decay?	288 (96.0)	12 (4.0)
Is dental caries a gum disease?	295 (98.3)	5 (1.7)
Should the gum pad of baby be cleaned with towel or napkin after feeding?	238 (79.3)	62 (20.6)
Can nocturnal bottle/breast feeding cause dental caries?	252 (84.0)	48 (16.0)
Can on demand/prolonged breast feeding cause dental caries?	95 (31.7)	205 (68.3)
Is dental caries transmissible from mother to child?	65 (21.7)	235 (78.3)
Are only bottle-fed babies affected by early childhood tooth decay?	70 (23.3)	230 (76.7)
Can untreated dental decay affect the general health of the child?	285 (95.0)	15 (5.0)
Should fluoride toothpaste be given to children younger than three years?	98 (32.7)	202 (67.3)
Are first signs of tooth decay white lines or spots on the tooth surfaces?	245 (81.7)	55 (18.3)
Are baby's milk teeth important even though they fall out?	264 (88.0)	36 (12.0)
Attitude		
Do you think you have adequate knowledge of oral health in children?	Yes	150 (50.0)
	No	125 (41.7)
	Don't know	25 (8.3)
Will you like to increase your knowledge on oral health in children?	Yes	286 (95.3)
	No	14 (4.7)
Do you feel confident enough to identify dental caries in children?	Yes	264 (88.0)
	No	36 (12.0)
Do you feel knowledgeable enough to discuss and counsel parents regarding home dental care for their children?	Yes	262 (87.3)
	No	23 (7.7)
	Don't know	15 (5.0)

Table-3: Dentists' knowledge stratified on age, gender, education, and work experience [n (%)]

Characteristics	Knowledge score		
	Excellent	Satisfactory	Poor
Age			
20–30 Years	41 (47.7)	127 (62.3)	9 (90)
31–40 Years	27 (31.4)	72 (35.3)	1 (10)
>40 Years	18 (20.9)	5 (2.5)	0 (0)
Gender			
Male	33 (38.4)	87 (42.6)	3 (30)
Female	53 (61.6)	117 (57.4)	7 (70)
Education level			
Graduate	45 (52.3)	167 (81.9)	9 (90)
Postgraduate	41 (47.7)	37 (18.1)	1 (10)
Clinical working experience			
1–3 Years	37 (43.0)	126 (61.8)	6 (60)
4–6 Years	7 (8.1)	43 (21.1)	4 (40)
>6 Years	42 (48.8)	35 (17.2)	0 (0)

Table-4: Correlation of dentists' knowledge score with age, gender, education and work experience (Mean±SD)

Characteristics	Knowledge score	p
Age		
20–30 Years	16.4±1.8	0.001
31–40 Years	16.6±2.1	
>40 Years	18.1±1.2	
Gender		
Male	16.5±1.8	0.746
Female	16.6±1.9	
Education level		
Graduate	16.3±1.7	<0.001
Postgraduate	17.4±2.0	
Clinical working experience		
1–3 Years	16.4±1.7	<0.001
4–6 Years	15.3±1.7	
>6 Years	17.8±1.6	

DISCUSSION

Dentists can influence the practices of their patients, staff members, family members, and the community because they are the team leaders in oral healthcare. For dentists to employ or propose certain preventive procedures/agents, a thorough understanding of the causes of caries and how to prevent it is imperative.⁷

Early childhood caries (ECC) is a serious public health problem in both developing and developed countries.⁸ The ECC can start at young age, advance swiftly in individuals with elevated risks, and frequently remains unaddressed. The outcomes can impact short-term and long-term wellbeing of the child's family, leading to notable social and economic ramifications.⁹ This study assessed dental professionals' understanding and perception related to infant oral health and early childhood caries. The findings offer important insight that can assist dental professionals to prevent oral diseases in infants.

The dentists' comprehension regarding the causes and prevention of early childhood caries was lacking in our respondents. Only about 21% of the participants understood that dental caries is an infectious condition and can pass from a mother to her child, while 78% did not have adequate knowledge. In a previous

study, only 14.7% of dental students had awareness that caries is an infectious disease.⁶ The knowledge in dental community needs to be improved in this regard. Many participants were unaware of the proper use and role of fluorides in prevention of caries. This is in agreement with Alshammari *et al*¹⁰ where the beneficial effects of fluorides in prevention of caries were not well-known to a relatively substantial percentage of their respondents.

Mutans Streptococci (MS) and Lactobacillus species which cause dental caries can be transmitted from a caregiver to a child via saliva contact.¹¹ Offspring of mothers with higher MS concentrations are at a heightened risk of experiencing caries at an earlier stage than those born to mothers with lower MS concentrations.¹² Shah *et al* observed that more than 30% of pre-dentated children at 3 months of age were infected with MS. Around 6 months of age, more than 60% showed bacterial presence.¹³ In order to lessen the transmission of cariogenic microorganisms, experts recommend parents or siblings to take measures to reduce their MS levels.¹⁴

Regarding oral hygiene practices, almost 80% dentists responded that cleaning the gum pads of infants is advisable. This response was better than the response observed by Retna Kumari *et al*¹⁵, where only 25% showed a positive response. A significant number of dental professionals (84.3%) agreed that mothers should start cleaning their children's teeth as soon as the first milk tooth erupts. More than half dental professionals (53.7%) included in our study suggested that cotton wool and toothpaste should be used. According to the American Academy of Pediatric Dentistry, oral hygiene measures for a child should start not later than when the first tooth erupts. A soft toothbrush of appropriate size and toothpaste of appropriate amount should be used by the parents to clean their children's teeth.² At 3 years age, it is recommended to use a smear of fluoridated toothpaste, while children of 3–6 years age should use a pea-sized amount of toothpaste.¹⁶ Almost half of the participants in our study were aware of these measures though more than 90% had knowledge about the amount of toothpaste to be used.

Dietary patterns like frequent intake and high consumption of sugary foods, beverages and drinks taken between meals have been associated with early childhood caries. Frequent night time bottle feeding and 'on demand' or prolonged breast feeding has been linked to early childhood caries. Almost all the dentists (96.3%) were aware that high sugar diet is a predisposing factor for ECC, and 84% concurred that night time bottle feeding of infants with formula milk can also increase the risk of ECC. Regarding frequency and duration of breastfeeding, 95% of the surveyed dentists believed that early childhood caries may be associated with breastfeeding on demand and its prolonged duration, which aligns with findings from a recent study.¹⁷

Despite varying reports in literature regarding the connection between early childhood caries (ECC) and breastfeeding, the policy statement from the American Academy of Pedodontists and the American Academy of Pediatrics advises against putting infants to sleep with a bottle filled with milk or sugary liquids, recommends avoiding prolonged breastfeeding after the eruption of the first tooth, encourages parents to introduce drinking from a cup by the age of one year, and suggests weaning at 12–18 months of age.²

Significant association between educational level and clinical working experience was noted in this study. Although the dentists had sufficient understanding of infant oral health they wished to enhance their expertise.

A limitation of this study was that it was conducted exclusively in the twin cities of Rawalpindi/Islamabad, and as such, the findings may not be broadly applicable to the entire population of dental practitioners in Pakistan. This underscores need for additional studies on this subject.

CONCLUSION

In younger age group dentists the knowledge and attitude was satisfactory but as the age, experience of dentists and qualification increased their knowledge further improved. This emphasises the need for dentists to get enrolled in Continuing Education/Refresher Courses to keeps them updated about the latest developments and best practices in dental care.

REFERENCES

1. Oredugba F, Agbaje M, Ayedun O, Onajole A. Assessment of mothers' oral health knowledge: towards oral health promotion for infants and children. *Health (Irvine Calif)* 2014;6(10):908–15.
2. BaniHani A, Tahmassebi J, Zawaideh F. Maternal knowledge on early childhood caries and barriers to seek dental treatment in Jordan. *Eur Arch Paediatr Dent* 2021;22(3):433–9.
3. Gomes APM, da Silva EG, Gonçalves SHF, Huhtala MFRL, Martinho FC, Gonçalves SE, *et al.* Relationship between patient's

- education level and knowledge on oral health preventive measures. *Int Dent Med J Adv Res* 2015;1:1–7.
4. Wilson AR, Mulvahill MJ, Tiwari T. The impact of maternal self-efficacy and oral health beliefs on early childhood caries in Latino children. *Front Public Heal* 2017;5:228.
5. Yamalik N. Dentist-patient relationship and quality care 1. Introduction. *Int Dent J* 2005;55(2):110–2.
6. Olatosi OO, Iwuala SO, Ojewola RW, Chukwudifu N, Oredugba FA, Sote EO. Undergraduate medical students' knowledge and attitude on early childhood caries and infant oral health. *J Pediatr Dent* 2016;4(1):8–13.
7. Ramos Gomez F, Crystal YO, Ng MW, Tinanoff N, Ramos-Gomez F, Featherstone JD. Caries risk assessment, prevention, and management in pediatric dental care. *Gen Dent* 2010;58:505–17.
8. Uribe SE, Innes N, Maldupa I. The global prevalence of early childhood caries: A systematic review with meta-analysis using the WHO diagnostic criteria. *Int J Paediatr Dent* 2021;31(6):817–30.
9. Lee GH, McGrath C, Yiu CK, King NM. A comparison of a generic and oral health-specific measure in assessing the impact of early childhood caries on quality of life. *Community Dent Oral Epidemiol* 2010;38(4):333–9.
10. Alshammari AF, Alenzi RH, Alanezi AA, Enizy AS, Aldakhil AM, Alkurdi KA. Knowledge and attitude of dentists toward silver diamine fluoride in Saudi Arabia. *Int J Clin Pediatr Dent* 2021;14(5):662–5.
11. Mallya PS, Mallya S. Microbiology and clinical implications of dental caries—A review. *J Evol Med Dent Sci* 2020;9(48):3670–5.
12. Yu OY, Lam WY, Wong AW, Duangthip D, Chu CH. Nonrestorative Management of Dental Caries. *Dent J (Basel)* 2021;9(10):121.
13. Shah SS, Dave BH. The co-relation of salivary Streptococcus Mutans' count between mother and their neonates within two days of life: An ex vivo microbial study. *J Pediatr Perinatol Child Health* 2022;6:104–14.
14. Berkowitz RJ. Mutans streptococci: acquisition and transmission. *Pediatr Dent* 2006;28(2):106–9.
15. Retna Kumari N, Sheela S, Sarada PN. Knowledge and attitude on infant oral health among graduating medical students in Kerala. *J Indian Soc Pedod Prev Dent* 2006;24(4):173–6.
16. Davies GM, Worthington HV, Ellwood RP, Bentley EM, Blinkhorn AS, Taylor GO, *et al.* A randomised controlled trial of the effectiveness of providing free fluoride toothpaste from the age of 12 months on reducing caries in 5–6-year old children. *Community Dent Health* 2002;19(3):131–6.
17. Shrestha A, Hoang H, Gardner S, Pradhan A, Crocombe L. Global early childhood caries: a review of literature. *Nepal Med Coll J* 2021;23(3):264–71.

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