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Impact of Parental Knowledge on the Oral Hygiene Practices of Children in Urban Communities in Bangladesh

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ABSTRACT

Dental caries remains one of the most prevalent yet preventable chronic conditions affecting children in Bangladesh. Although parental influence is widely recognized as a key determinant of children's oral hygiene behaviors, empirical evidence focusing on urban Bangladeshi populations remains limited. This study seeks to address this gap by examining the influence of parental knowledge on children's oral hygiene practices in urban communities of Bangladesh. A community-based cross-sectional study was conducted among 368 parents or primary caregivers selected through simple random sampling from major urban areas of Bangladesh. Data were collected using a validated structured questionnaire that assessed parental oral health knowledge, demographic characteristics, and children's oral hygiene practices. Statistical analyses, including analysis of variance (ANOVA) and Chi-square tests, were employed to examine associations between parental characteristics and children's oral hygiene behaviors. The findings revealed that parental education level and age were significant predictors of children's oral hygiene practices. Parents with higher educational attainment and those aged 26–35 years were more likely to engage in early preventive oral health behaviors, including cleaning infants' gum pads, caring for the first erupted tooth, and supervising toothbrushing. No significant gender-based differences were observed in parental knowledge levels. Across all groups, dentists were identified as the most trusted and reliable source of oral health information. This study provides context-specific evidence highlighting the critical role of parental knowledge in shaping children's oral hygiene practices in urban Bangladesh. The findings support the integration of parent-centered oral health education into national child health and preventive dentistry initiatives to reduce the burden of childhood dental caries and improve long-term oral health outcomes.

INTRODUCTION

Dental caries remains one of the most common chronic childhood diseases globally, posing a major public health challenge despite being largely preventable (Nayak *et al.,* 2025). It significantly affects children's oral and general health, often impairing nutrition, speech, school performance, and overall quality of life. In many developing countries, including Bangladesh, the burden of dental caries is exacerbated by limited awareness, inadequate access to dental care, and inconsistent hygiene practices (Khan *et al.,* 2025). Urban communities in Bangladesh, although comparatively better served than rural areas, still face substantial disparities in oral health knowledge and practices due to socioeconomic variation and differences in parental educational backgrounds (Omura *et al.,* 2025). Parents play a central role in guiding their children's daily habits, including oral hygiene (Ludovichetti *et al.,* 2025). Children typically adopt behaviors modeled and reinforced by their parents, making parental knowledge, attitudes, and practices (KAP) crucial determinants of children's oral health outcomes (Wang *et al.,* 2025). When parents possess adequate understanding of oral hygiene, they are more likely to ensure that their children adopt proper brushing habits, use appropriate toothpaste, and maintain routine dental visits (Ludovichetti *et al.,* 2025). Research from multiple regions has consistently shown that parental education and socioeconomic status (SES) have significant effects on children's oral hygiene behaviors (Senavirathna *et al.,* 2025). Higher educational attainment often correlates with greater awareness of preventive practices, early recognition of oral health problems, and timely seeking of professional dental care (Setiawan *et al.*, 2025). In the context of Bangladesh, parental influence becomes even more prominent due to cultural norms that position parents as the primary decision-makers regarding children's daily routines and health behaviors. Despite this, studies focusing specifically on the impact of parental knowledge on children's oral hygiene habits within Bangladeshi urban communities remain limited (Islam *et al.,* 2025). Previous international studies have found that children whose parents are better informed about oral hygiene practices tend to have lower rates of dental caries. For instance, research illustrates that educated parents are more likely to supervise toothbrushing, select fluoride-containing toothpaste, limit sugary snacks, and seek professional dental advice when necessary (Alonazi *et al.,* 2024). Conversely, limited parental awareness often results in delayed dental visits, irregular brushing, improper techniques, and overall poor oral hygiene among children (Hammouri *et al.,* 2024).

Guidelines from global dental bodies emphasize the importance of parental involvement in maintaining

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children's oral hygiene (Han *et al.,* 2025). Recommendations indicate that until children develop the motor skills to brush independently and effectively, parents should assist or supervise brushing to ensure thorough cleaning (Esposito *et al.,* 2024). Studies further show that brushing twice daily with a soft-bristled toothbrush and fluoride toothpaste significantly reduces the incidence of dental caries (Min *et al.,* 2024). Additionally, evidence suggests that brushing for at least two minutes is essential for effective plaque removal and long-term oral health benefits. Despite these established guidelines, the oral hygiene practices adopted in many Bangladeshi households fall short of recommended standards. Factors such as misconceptions about dental care, limited exposure to professional oral health education, and prioritization of other health needs often hinder adherence to proper hygiene routines (Bolukbasi & Dundar, 2024). In urban communities, where lifestyles are rapidly changing and children are increasingly exposed to sugary diets and unhealthy snacking habits, understanding the influence of parental knowledge becomes even more critical. Exploring parental awareness is therefore essential for developing community-based oral health programs in Bangladesh. Properly informed parents are more capable of recognizing early signs of dental issues, reinforcing good hygiene habits, and ensuring sustained preventive care. Moreover, analyzing the connections between parental education, socioeconomic conditions, and actual hygiene practices can help identify key gaps that need to be addressed to improve oral health outcomes among children. This study aims to contribute to the growing body of literature by examining the impact of parental knowledge on the oral hygiene practices of children residing in urban Bangladesh. It investigates not only parents' awareness and attitudes but also how educational attainment and socioeconomic background influence the habits they encourage in their children. By identifying these associations, the research seeks to offer insights that can support targeted interventions, inform policy development, and strengthen preventive dental health programs within urban communities (Canessa-Rojas *et al.,* 2025). Ultimately, promoting oral hygiene among children requires more than clinical treatment; it demands empowering parents with accurate, practical, and accessible knowledge. Understanding the dynamics of parental influence in Bangladesh's urban environment is a crucial step toward reducing the burden of dental caries and paving the way for healthier generations.

LITERATURE REVIEW

Dental caries is widely recognized as one of the most persistent oral health challenges faced by children, particularly in low- and middle-income countries (Setiawan *et al.*, 2025). Although preventable, it continues to affect millions of children and negatively influences their physical, emotional, and social well-being (Tripathi & Patani, 2025). In urban areas of Bangladesh, rapid population growth, lifestyle transitions, increased sugar consumption, and limited awareness about oral hygiene significantly contribute to the rising prevalence of dental caries (Han *et al.,* 2025). Understanding the parental role in shaping children's oral hygiene practices is therefore crucial, as parents serve as the primary decision-makers and influencers regarding their children's daily routines, dietary habits, and health-seeking behaviors. Parents directly impact their children's oral hygiene by determining when brushing begins, which products to use, and how often oral care activities are performed (Girard *et al.,* 2024). In many Bangladeshi households, especially in urban communities where parents face busy work schedules, children's oral hygiene practices may be inconsistent due to a lack of supervision or proper guidance (Khan *et al.,* 2025). Parents' perceptions of oral health, their understanding of caries prevention, and their awareness of appropriate brushing techniques all contribute to the foundations of oral hygiene that children develop (Liu *et al.,* 2024). When parents are well-informed about oral health, they tend to encourage brushing twice daily, supervise brushing for younger children, and ensure the use of fluoride toothpaste, which are key factors in preventing dental caries. Parental education plays a significant role in shaping oral hygiene practices. Parents with higher levels of education generally possess better knowledge of preventive health behaviors and are more likely to prioritize oral health. In urban Bangladesh, educated parents tend to be more aware of the importance of early childhood oral care, such as cleaning gum pads, choosing appropriate brushing methods, and seeking professional dental care when needed. On the other hand, parents with limited formal education may lack exposure to oral health information, resulting in lower hygiene awareness and less effective practices within the household (Alzahrani *et al.,* 2024). This gap highlights the need to analyze how education influences parental decision-making and subsequently affects children's oral hygiene outcomes. Socioeconomic status is another important determinant of oral hygiene practices among children. Families from higher socioeconomic backgrounds typically have greater access to quality oral care products, routine dental check-ups, and health information. In contrast, parents from lower-income urban communities may prioritize other pressing financial responsibilities over oral health, leading to irregular brushing habits, poor dietary control, and limited use of fluoride toothpaste. Urban slum communities in Bangladesh often exhibit the highest caries prevalence due to limited resources, insufficient knowledge, and inadequate public health support systems (Osuh *et al.,* 2024). These conditions emphasize the importance of socioeconomic variations in determining oral hygiene behavior. Parental attitudes toward oral hygiene also play a pivotal role. Parents who view oral health as integral to overall well-being are more likely to instill positive habits in their children. Such attitudes influence daily routines, dietary restrictions, and the frequency of dental visits. However, in many Bangladeshi families, misconceptions

persist for example, the belief that primary teeth are unimportant because they eventually fall out (Thompson, 2024). These misconceptions lead to neglect of early oral hygiene and delayed intervention, which increases the risk of caries development. Understanding parental attitudes is therefore crucial in designing effective oral health interventions. Cultural beliefs and behavioral patterns influence oral hygiene practices as well. Traditional cleaning methods, such as using fingers instead of toothbrushes or miswak sticks, are still practiced in some communities. While these methods may offer limited benefits, they are often not adequate substitutes for modern oral hygiene practices, especially in preventing plaque accumulation. Additionally, high consumption of sugary snacks, sweetened beverages, and sticky foods common in urban Bangladeshi children further intensifies the risk of dental caries. Parents who are aware of the harmful effects of sugar on oral health tend to monitor their children's diet more effectively (Guerra *et al.,* 2024). The role of healthcare professionals, particularly dentists, is crucial in shaping parental knowledge. In many studies conducted within urban settings, dentists were found to be the primary source of oral health information for parents. In Bangladesh, however, regular dental visits are often prompted only by pain or visible problems rather than preventive care. This reactive approach contributes to late diagnosis and increases the likelihood of complications. Strengthening parental engagement through dental professionals and expanding community-based oral health promotion programs can significantly improve awareness and preventive behaviors (Nghayo *et al.,* 2024). Mass media, schools, and community campaigns also contribute to parental knowledge. In urban Bangladesh, where internet access and digital media usage are rapidly growing, health-related messages can effectively reach parents. Integrating oral hygiene awareness into school-based programs may further reinforce positive habits among children, especially when combined with parental involvement. Despite these opportunities, there remains a significant gap between knowledge and actual practice in many households, indicating the need for targeted research focusing on the barriers that prevent parents from translating knowledge into consistent behavior. Overall, the literature highlights a clear relationship between parental knowledge, education, socioeconomic status, and children's oral hygiene practices (Alzahrani *et al.,* 2024). In the context of urban Bangladesh, where disparities in awareness and resources persist, parents' understanding and attitudes toward oral health become even more critical. Enhanced parental knowledge is likely to lead to timely brushing habits, proper technique supervision, and healthier dietary choices for children, ultimately reducing the burden of dental caries.

MATERIALS AND METHODS

This cross-sectional, community-based study was conducted in selected urban communities of Bangladesh between June and August 2024 to assess the impact of parental knowledge on the oral hygiene practices of children. Ethical approval was obtained from the appropriate institutional review committee, and written informed consent was secured from all participating parents or caregivers. The study population consisted of parents residing in major urban neighborhoods, including Dhaka, Chattogram, Khulna, and Rajshahi, with the aim of ensuring representation from diverse socioeconomic groups commonly found in urban Bangladesh. A simple random sampling technique was used to recruit participants, allowing equal opportunity for selection among eligible households. The sample size of 368 participants was determined using the standard formula for cross-sectional studies, assuming a 95% confidence level, 50% expected prevalence of adequate parental awareness, and a 5% margin of error. A design effect of 1.2 was incorporated to account for potential clustering effects in urban settings, and an additional 10% was added to compensate for possible non-responses, resulting in the final required sample size of 368. A structured, self-administered questionnaire was used to collect data. It included 16 close-ended items designed to assess parents' knowledge, attitudes, and practices regarding their children's oral hygiene. The questionnaire contained multiple-choice, dichotomous, and ordinal-scale questions, along with demographic variables such as the parent's age, gender, educational level, and occupation. Educational status was categorized broadly to reflect the Bangladeshi context, ranging from primary education to postgraduate level. The tool was initially developed in English and then translated into Bangla to ensure clarity and accessibility for local respondents. A back-translation procedure was performed to verify accuracy and maintain conceptual equivalence between language versions. Prior to full deployment, the questionnaire underwent a pilot test among a small group of parents to assess clarity, reliability, and overall feasibility, after which minor modifications were made. Data collection was conducted using both in-person and digital approaches to maximize reach across busy urban populations. Paper-based surveys were distributed to parents visiting outpatient dental clinics and community health centers in the selected cities. Additionally, a digital version of the questionnaire was created using Google Forms and shared with parents through social media platforms and messaging applications commonly used in urban Bangladesh, such as WhatsApp and Facebook Messenger. This hybrid data collection method ensured inclusion of participants with varying levels of access to healthcare facilities and digital resources. Parents or caregivers were eligible for inclusion if they had at least one child aged 14 years or younger and provided informed consent to participate. Individuals were excluded if they had children aged 15 years or older, did not have children, or declined participation despite being approached. The study adhered to the STROBE guidelines for observational research, ensuring methodological rigor, transparency, and reliability throughout the data collection and reporting process.

RESULTS AND DISCUSSION

A total of 368 parents from various urban communities in Bangladesh participated in the study. Among them, 88 were male and 280 were female, indicating a predominance of mothers as primary respondents. The largest proportion of participants (n = 186) fell within the 26–35-year age group, representing parents who are typically the most active in child-rearing responsibilities. Only a small number of participants (n = 6) were above 56 years, reflecting the limited involvement of older guardians in daily child health activities. Analysis of the mean knowledge scores across different education levels revealed statistically significant variations. Parents with higher educational attainment, particularly those with postgraduate qualifications, demonstrated substantially greater knowledge regarding children's oral hygiene practices. This association was found to be highly significant (p = 0.000), indicating that education remains a strong predictor of oral health awareness among urban Bangladeshi parents.

Table 1: One-Way ANOVA Analysis of Parental Socio-Demographic Factors and Knowledge Scores

Variable	Sum of Squares	df	Mean Square	F	p-value	Interpretation
Education	Between Groups: 59.048	4	14.762	5.201	0.000	Higher education associated with higher knowledge scores
	Within Groups: 1030.340	363	2.838			
	Total: 1089.389	367				
Age	Between Groups: 42.755	4	10.689	3.707	0.006	Parents aged 26–35 have higher knowledge scores
	Within Groups: 1046.633	363	2.883			
	Total: 1089.389	367				

Similarly, parental age showed a significant influence on knowledge scores (p = 0.006). The 26–35-year age group displayed the highest levels of awareness about children's oral hygiene, suggesting that this demographic segment is more engaged in preventive health behaviors and more proactive in seeking oral health information. Their heightened involvement likely reflects their direct responsibility in managing the daily health routines of young children. These results highlight clear disparities in parental knowledge across education and age groups within urban Bangladesh, underscoring the need for targeted awareness programs focused on less educated and older caregivers to improve overall child oral hygiene outcomes.

Table 2: Comparison of practice-based questions based on age.

Question / Practice	15–25	26–35	36–45	46–55	>56	Chi-square	p-value
Did you clean your child's gum pads when toothless?						15.082	0.005
Yes	39	113	56	19	0		
No	12	73	40	10	6		
If yes, how did you clean your child's gum pads?						23.944	0.021
Finger	14	61	31	11	0		
Cotton / gauze	20	36	15	5	0		
Toothpaste	5	17	9	3	0		
Did you clean the first erupted tooth?						3.216	0.522
Yes	29	102	51	11	3		
No	22	84	45	18	3		
If yes, how did you clean it?						32.754	0.008
Fingers	6	42	24	0	0		
Cotton / gauze	9	18	9	6	3		
Plain toothbrush	10	16	9	3	0		
Toothbrush & toothpaste	4	26	9	2	0		
Awareness of kids' toothpaste brands						59.764	0.000
Not aware	17	73	39	9	0		
Colgate	20	61	35	16	6		
Mama earth	0	23	8	0	0		

Chicco	6	9	0	0	0		
Pigeon	0	6	3	0	0		
Dente 91	6	10	11	3	0		
Baby organo	2	4	0	0	0		
Cocomo	0	0	0	1	0		
Do you monitor your child when brushing?						21.403	0.000
Yes	37	168	69	21	6		
No	14	18	27	8	0		
Do you monitor the time for brushing?						11.743	0.019
Yes	30	141	57	18	3		
No	21	45	39	11	3		
Source of dental information						23.042	0.027
TV	2	9	9	3	0		
Social media	12	15	15	0	0		
Elders	14	49	27	11	3		
Dentist	23	113	45	15	3		

Table 2 displays analysis of oral hygiene practices across different age groups which indicated significant variations. Parents aged 26-35 years were most diligent in cleaning their children's gum pads ($p = 0.005$), predominantly using fingers or cotton/gauze ($p = 0.021$). However, awareness of children's toothpaste brands was paradoxically lower in this age group, although Colgate remained the most recognized brand overall ($p = 0.000$). This group also showed the highest vigilance in supervising their children's brushing habits and monitoring the duration of brushing ($p = 0.019$). Across all age groups, dentists emerged as the primary and trusted source of dental health information ($p = 0.027$).

Table 3: Comparison of practice-based questions based on gender.

Question / Practice	**Male (Count)**	**Female (Count)**	**Chi-square**	**p-value**
Did you clean your child's gum pads when toothless?	Yes: 52	Yes: 15	0.329	0.566
	No: 36	No: 105		
If yes, how did you clean gum pads?	Finger: 28	89	1.802	0.614
	Cotton/gauze: 14	62		
	Toothpaste: 9	25		
Did you clean the first erupted tooth?	Yes: 58	142	7.433	0.006
	No: 30	142		
If yes, how did you clean it?	Fingers: 15	57	20.829	0.000
	Cotton/gauze: 15	30		
	Plain toothbrush: 19	19		
	Toothbrush & toothpaste: 9	32		
Awareness of kids' toothpaste brands	Not aware: 26	124	3.443	0.062
	Colgate: 35	103		
	Mama earth: 7	24		
	Chicco: 3	12		
	Pigeon: 3	6		
	Others: 5	16		
Do you monitor your child when brushing?	Yes: 67	151	2.486	0.115
	No: 21	46		
Do you monitor brushing duration?	Yes: 52	83	3.884	0.049
	No: 36	83		

Source of dental information	TV: 12	16	16.594	0.001
	Social media: 3	39		
	Elders: 25	79		
	Dentist: 48	151		

Table 3 shows gender-wise analysis of oral hygiene practices in which female caregivers demonstrated greater involvement in cleaning their child's first erupted tooth ($p = 0.006$), most frequently employing their fingers as the cleaning method ($p = 0.000$). Although there were no significant gender differences in gum pad cleaning or awareness of children's toothpaste brands, females showed slightly higher attentiveness in monitoring brushing duration ($p = 0.049$). Notably, both genders largely relied on dentists for dental health information ($p = 0.001$), but females also cited elders and social media as additional resources.

Table 4: Comparison of practice-based questions based on educational level.

Question / Practice	Middle school	10th grade	High school	Undergraduate (UG)	Postgraduate (PG)	Chi-square	p-value
Did you clean your child's gum pads when toothless?	Yes: 63	9	9	44	102	66.036	0.000
	No: 48	27	24	24	18		
If yes, how did you clean gum pads?	Finger: 36	6	6	27	42	84.208	0.000
	Cotton/ gauze: 24	0	3	12	37		
	Toothpaste: 3	3	0	5	23		
Did you clean the first erupted tooth?	Yes: 49	12	6	41	88	46.535	0.000
	No: 62	24	27	27	32		
If yes, how did you clean it?	Fingers: 15	9	0	21	27	64.563	0.000
	Cotton/ gauze: 9	0	3	9	24		
	Plain toothbrush: 14	0	3	3	18		
	Toothbrush & toothpaste: 12	3	0	8	18		
Awareness of kids' toothpaste brands	Not aware: 53	21	10	22	32	83.766	0.000
	Colgate: 39	12	18	27	42		
	Mama earth: 7	0	0	16	8		
	Chicco: 3	0	3	0	9		
	Pigeon: 0	3	0	0	6		
	Others: 5	6	0	2	3		
Do you monitor your child							

Table 4 shows that parents in urban communities of Bangladesh with undergraduate and postgraduate education were significantly more likely to clean their children's gum pads and first erupted teeth ($p = 0.000$) and to use appropriate tools such as gauze, toothbrush, and toothpaste ($p = 0.000$). These parents also exhibited higher awareness of children's toothpaste brands, including Colgate and Mama earth ($p = 0.000$), and were more diligent in supervising their children while brushing, as well as monitoring brushing duration ($p = 0.000$). Additionally, they predominantly relied on professional sources, particularly dentists, for oral health information

($p = 0.001$), whereas parents with lower education levels depended more on social sources such as elders, TV, or social media. These findings underscore the critical impact of parental knowledge and education on children's oral hygiene practices in urban Bangladeshi settings.

The findings of this study provide important insights into the role of parental knowledge in shaping children's oral hygiene practices in urban communities of Bangladesh. Out of 368 participants, 76% were mothers and 24% were fathers, reflecting a higher involvement of mothers in children's oral care. This aligns with broader observations that mothers often take primary responsibility for child health decisions, though the participation of fathers, even at lower levels, highlights the need for awareness campaigns targeting both parents to ensure comprehensive engagement in oral health practices. Parental education emerged as a key determinant of children's oral hygiene. Parents with undergraduate and postgraduate qualifications demonstrated significantly higher knowledge scores and were more likely to clean their children's gum pads and first erupted teeth, use appropriate cleaning tools, and be aware of children's toothpaste brands. In contrast, parents with lower educational attainment, including middle school or high school, exhibited lower knowledge and less engagement in recommended practices. These findings underscore the importance of expanding oral health education beyond formal schooling to reach less-educated caregivers effectively. Gender was not a significant factor in knowledge levels, as male and female caregivers showed similar awareness regarding children's oral hygiene. This indicates that fathers, despite being fewer in number, are equally capable of implementing proper oral care practices, reinforcing the need to include both genders in awareness programs. Age, however, had a notable impact; parents aged 26–35 demonstrated the highest engagement in hygiene practices, whereas older caregivers, particularly those above 56 years, lacked awareness of practices such as cleaning infants' gum pads. Considering that grandparents often contribute to childcare in Bangladesh, addressing these knowledge gaps among older caregivers is essential to ensure consistent oral hygiene for children. The study also highlighted variations in practical oral care behaviors. While a majority of parents (around 75%) were aware of the importance of brushing twice daily, a significant proportion (nearly 47%) neglected to clean their child's first erupted teeth, underestimating the importance of primary dentition. The most common methods for cleaning gum pads were fingers and cotton/gauze, with toothpaste used by a small minority, reflecting a need for clearer guidance on proper techniques. Awareness of children's toothpaste brands, such as Colgate was higher among educated parents, who also relied more on professional sources, especially dentists, for oral health information. Less-educated parents tended to depend on social sources, including elders, TV, and social media, which may provide inconsistent guidance. These findings emphasize the critical role of parental knowledge, shaped by education and age, in promoting effective oral hygiene practices in urban Bangladeshi children. Implementing structured oral health education programs through schools, community workshops, and online platforms can bridge knowledge gaps and foster consistent preventive practices. Future research could assess the long-term impact of such interventions on children's oral health outcomes. By enhancing parental awareness and engagement, it is possible to improve oral hygiene habits in children, ultimately contributing to healthier generations in urban Bangladesh.

CONCLUSION

This study demonstrates that parental knowledge, particularly influenced by educational attainment and age, plays a decisive role in shaping children's oral hygiene practices in urban communities of Bangladesh. Parents with undergraduate and postgraduate education and those aged 26–35 years were significantly more proactive in maintaining early oral hygiene, including cleaning gum pads, caring for the first erupted tooth, supervising brushing, and monitoring brushing duration. These findings are consistent with existing international evidence that links higher parental awareness with improved preventive oral health behaviors among children. The principal contribution of this research lies in its context-specific insights for urban Bangladesh, where rapid lifestyle changes, increased sugar consumption, and uneven access to oral health information heighten the risk of childhood dental caries. The study highlights important gaps among less-educated and older caregivers, who were less engaged in recommended practices and more likely to rely on informal information sources. Given the common involvement of extended family members in childcare, these gaps may weaken preventive efforts if not adequately addressed. Several limitations should be considered. The cross-sectional design restricts causal interpretation, and the use of self-reported data may introduce recall or social desirability bias. Additionally, the urban-focused sample limits the generalizability of findings to rural settings. Future longitudinal and nationally representative studies incorporating clinical oral health assessments are recommended. From a policy perspective, the findings support integrating parental oral health education into national child health and non-communicable disease prevention strategies. Strengthening dentist-led counseling, school-based programs, and community awareness initiatives can enhance parental knowledge and support Bangladesh's national oral health goals by promoting sustainable preventive behaviors among children.

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