



Oral Hygiene Knowledge among Parents of Primary Schoolchildren Attending a Tertiary Hospital in Dhaka, Bangladesh

Emi Hasan¹, Israt Jahan², Md Ashikur Rahman¹, Isfat Jahan³, Nadia Ahmed⁴, A. K. M. Shamsul Alam⁵, Md Ranzu Ahmed^{6*}

1. Department of Public Health, University of South Asia, Dhaka, Bangladesh.
2. Department of Health Promotion & Health Education, Bangladesh University of Health Sciences (BUHS), Dhaka, Bangladesh.
3. Department of Public Health, Middlesex University London, London, United Kingdom.
4. Department of Biochemistry and Cell Biology, Bangladesh University of Health Sciences (BUHS), Dhaka, Bangladesh.
5. Department of Dermatology, CMSS Institute of Medical Technology, Noakhali, Bangladesh.
6. Department of Chemistry, Bangladesh University of Health Sciences (BUHS), Dhaka, Bangladesh.

*Corresponding author. E-mail address: drranzubd@buhs.ac.bd (MR Ahmed)

Abstract: **Background:** Globally, oral diseases are recognized as one of the most widespread non-communicable disease burdens, and healthy oral hygiene habits are best established in early life. Parents play an important role in shaping children's oral hygiene routines, dietary behaviours, and use of dental services. **Aim:** This study assessed oral hygiene knowledge among parents of primary school-going children attending a tertiary-care hospital in Dhaka, Bangladesh. **Methods:** A descriptive cross-sectional study was conducted in the outpatient department of selected Hospital in Dhaka city. A total of 200 parents were selected by using purposive sampling. Data were collected using a pre-tested, structured questionnaire covering socio-demographic characteristics and oral hygiene domains, including tooth-cleaning frequency and duration, brushing technique, toothbrush and toothpaste, fluoride, mouthwash, interdental cleaning, dental attendance, and dietary habits. Correct responses were assigned a score of 1, whereas incorrect or unanswered responses were scored 0. Knowledge level was categorized using Bloom's cut-off criteria (Good $\geq 80\%$, Fair 60-79%, Poor $< 60\%$). Descriptive statistics were presented as frequencies and percentages. **Results:** Among the 200 respondents, 51.0% had completed higher secondary education. Toothbrush and toothpaste were reported as the main tooth-cleaning method by 91.5% of respondents. Only 34.5% reported brushing twice daily, while 5.5% selected 2-3 minutes as the brushing duration, and 30.5% did not know a brushing technique. More than half (53.0%) did not know whether their toothpaste contained fluoride, and 95.0% did not know its preventive purpose. Only 27.5% identified sweetened foods as a cause of dental decay, whereas 58.5% did not know. Overall, 26.0% of respondents had poor knowledge, 43.0% had fair knowledge, and 31.0% had good knowledge. Good knowledge showed a descriptive increase with higher educational attainment. **Conclusion:** Substantial gaps were identified in parents' knowledge of tooth brushing, fluoride toothpaste, interdental cleaning, and dietary risks. Parent-focused oral-health education, integrated with school- and community-based oral-health services, may help strengthen preventive practices. However, the findings should be interpreted cautiously because the study used a single-centre purposive sample and the original research report contains some internal data inconsistencies.

Keywords: Dental caries, oral-health literacy, oral hygiene, schoolchildren, fluoride, preventive dentistry.

INTRODUCTION

Oral-health is an integral component of general health and well-being. The World Health Organization (WHO) describes oral-health as important for eating, breathing, speaking, and participation in society, while the global burden of oral diseases remains substantial. The WHO Global Oral Health Status Report estimated that oral diseases affect approximately 3.5 billion people worldwide and emphasized persistent inequalities in prevention, access to care, and outcomes [1]. Dental caries and periodontal disease are major contributors to this burden, and many oral conditions are preventable through population-level and individual preventive measures [1,2].

The importance of prevention is particularly evident during childhood. Dental caries can begin early in life and may affect nutrition, sleep, school attendance, concentration, and quality of life. Children's oral-health behaviours are influenced not only by the availability of dental services but also by daily routines established in the household. Parents or caregivers commonly determine when and how children brush, the oral hygiene products used, dietary patterns, responses to oral symptoms, and whether professional dental care is sought. Consequently, parental knowledge represents an important modifiable factor in the oral-health environment in which children grow [3].

Tooth-brushing with fluoride toothpaste is a central component of caries prevention. Contemporary WHO guidance identifies fluoride toothpaste as a cost-effective preventive intervention and describes twice-daily brushing with appropriately fluoridated toothpaste as a lifelong preventive behaviour [4]. The effectiveness of this measure depends not simply on possessing a toothbrush or toothpaste, but on understanding appropriate frequency, duration, technique, and the preventive role of fluoride. Deficiencies in parental understanding may therefore translate into suboptimal practices in children.

Diet is another important component of oral-health prevention. Frequent exposure to free sugars is associated with increased dental caries risk, and dietary habits are shaped substantially by family practices. Snacks and sweetened foods or beverages between meals can increase the frequency of acid challenges to dental tissues. Parent education therefore needs to address both what children consume, the frequency and circumstances of consumption [5].

Interdental cleaning and appropriate dental attendance also form part of preventive oral care. However, knowledge of these measures may be less widespread than knowledge of tooth brushing. Inappropriate use of improvised objects for cleaning between teeth can be a concern when parents are not provided with clear, practical guidance, and awareness of dental floss and interdental brushes has been reported to be limited among Bangladeshi schoolchildren [6]. Likewise, uncertainty about when children should receive professional dental assessment can delay preventive care.

Bangladesh faces substantial challenges in delivering oral-health promotion within a large and densely populated population. Several studies from Bangladesh have documented gaps in oral-health knowledge and hygiene practices among schoolchildren and their families, highlighting school-based oral-health education as a promising strategy for improving awareness and fostering positive behavioural change [6,7]. More recent evidence from Dhaka continues to demonstrate variation in mothers' oral-health

knowledge and practices, reinforcing the relevance of parental education as a public-health issue [3].

To date, limited local evidence has specifically assessed parental knowledge of oral hygiene among parents of primary school-going children attending hospital outpatient departments in Dhaka, Bangladesh. This gap prompted the present study, which aimed to describe parental knowledge across key domains of oral hygiene and to examine its distribution by selected sociodemographic characteristics.

The primary objective was to assess the level of oral hygiene knowledge among parents of primary school-going children attending the hospital. The specific objectives were to assess knowledge concerning tooth-brushing time and technique, toothbrush and toothpaste, mouthwash and interdental cleaning, dietary habits, and selected socioeconomic characteristics. The study's applied significance lies in identifying specific knowledge gaps that can be targeted by parent education, school-health initiatives, and community-oriented preventive dental services.

MATERIALS AND METHODS

Study Design and Setting

This descriptive cross-sectional study was conducted in the outpatient department (OPD) of Shaheed Monsur Ali Medical College and Hospital (SMMCH), Uttara, Dhaka, Bangladesh. As the densely populated capital of Bangladesh, Dhaka encompasses a demographically diverse population, and the OPD of the selected hospital serves a broad catchment area, including parents accompanying children for a range of paediatric and general health concerns. This setting was purposively selected as it offered convenient and consistent access to parents of primary school-going children during their routine hospital visits, thereby enabling knowledge assessment to be integrated into existing clinical encounters without the additional logistical burden of a separate household- or school-based survey.

Study Population and Eligibility

The study population comprised parents of primary school-going children attending the hospital. Parents accompanying a primary school-going child and willing to provide information were eligible. Parents without primary school-going children and those who declined consent were excluded.

Sample Size and Sampling

A total of 200 parents were enrolled using purposive sampling. Sample size was estimated using the conventional single-proportion formula ($n = Z^2pq/d^2$), where an anticipated proportion (p) of 0.50, its complement ($q = 1-p$) of 0.50, a Z -value of 1.96 (corresponding to a 95% confidence level), and a margin of error (d) of 0.05 yielded a calculated minimum sample size of 384. However, due to constraints related to the limited data collection timeframe within the academic schedule, funding availability, and the number of eligible parents attending the OPD during the study period, continued recruitment to reach this calculated minimum was not feasible, and the final sample comprised 200 respondents.

Questionnaire and Data Collection

Data were collected using a pre-tested, structured, close-ended questionnaire in Bangla. The instrument covered sociodemographic characteristics (age, sex, educational qualification, monthly family income, and family size), tooth-cleaning factors (frequency, duration, method and materials, toothbrush and toothpaste type, interdental cleaning, and cleaning after meals), and food-related factors (sweetened foods and drinks, cleaning after sweetened foods, and snacks between meals). Written informed consent was obtained before participation.

Knowledge Scoring

The original report defines knowledge as familiarity, awareness, or understanding acquired through experience or education. Each correct response to a knowledge-related question was assigned 1 mark; each incorrect or unanswered response received 0. Knowledge scores were categorized using Bloom's cut-off points, where 80-100% of the total score was classified as good knowledge, 60-79% as fair knowledge, and below 60% as poor knowledge [8]. Descriptive statistics were presented as frequencies and percentages.

Data Management and Analysis

Completed questionnaires were checked, verified, and edited before data entry into Microsoft Excel, according to the original report. Analysis was descriptive and consisted of frequencies and percentages. No inferential statistical test was reported in the source material; consequently, the education-related gradient in knowledge is presented descriptively and is not interpreted as a statistically tested association.

RESULTS

A total of 200 parents participated in the study. The largest proportion belonged to the 30-39 years age group (51.5%), followed by 40-49 years (22.5%), 20-29 years (16.5%), and 50-59 years (9.5%).

Table 1: Sociodemographic characteristics of respondents (n=200).

Characteristic	Category	n	%
Age	20-29 years	33	16.5
	30-39 years	103	51.5
	40-49 years	45	22.5
	50-59 years	19	9.5
Sex	Male	112	56.0
	Female	88	44.0
Educational Background	SSC	12	6.0
	HSC	102	51.0
	Graduate	57	28.5
	Masters	29	14.5

Male respondents comprised 56.0% of the sample, while female respondents comprised 44.0%. With regard to educational attainment, more than half of respondents (51.0%) had completed HSC (Higher Secondary Certificate), 28.5% were graduates, 14.5% held a master's degree, and 6.0% had completed SSC (Secondary School Certificate) only (Table 1).

Tooth-brushing Frequency, Duration, and Technique

Forty-one percent of respondents reported brushing once daily, 34.5% twice daily, and 25.0% more than twice daily. With regard to brushing duration, 59.0% reported less than two minutes, 30.0% more than three minutes, 5.5% two to three minutes, and 5.5% did not know. A total of 61 respondents (30.5%) did not know how to brush according to the response categories presented in the questionnaire (Table 2).

Table 2: Reported tooth-brushing frequency, duration and technique (n=200).

Indicator	Response	n	%
Frequency	Once daily	81	40.5
	Twice daily	69	34.5
	More than twice daily	50	25.0
Duration	2-3 minutes	11	5.5
	<2 minutes	118	59.0
	>3 minutes	60	30.0
	Don't know	11	5.5
Technique	Don't know	61	30.5

Tooth-cleaning Materials, Toothbrush and Fluoride Toothpaste

Toothbrush and toothpaste were reported by 91.5% of respondents as the materials used for tooth cleaning; 4.5% used tooth powder, 3.5% meswak, and 0.5% another material. Regarding toothbrush type, 36.5% reported a soft brush, 21.0% a hard brush, and 42.5% did not know. Forty percent identified fluoride-containing toothpaste, 7.0% non-fluoride toothpaste, and 53.0% did not know. When asked the purpose of fluoride toothpaste, only 1.0% selected prevention of tooth decay and 4.0% selected strengthening teeth, whereas 95.0% did not know (Table 3).

Table 3: Distribution of respondents by tooth-cleaning materials, toothbrush type, and fluoride knowledge (n=200).

Indicator	Response	n	%
Cleaning material	Toothbrush and paste	183	91.5
	Tooth powder	9	4.5
	Meswak	7	3.5
	Other	1	0.5
Toothbrush	Soft	73	36.5

	Hard	42	21.0
	Don't know	85	42.5
Toothpaste	With fluoride	80	40.0
	Without fluoride	14	7.0
	Don't know	106	53.0
Purpose of fluoride	Prevent tooth decay	2	1.0
	Strengthen teeth	8	4.0
	Don't know	190	95.0

Mouthwash, Interdental Cleaning and Dental Visits

Thirty percent of respondents reported knowledge of mouthwash, while 70.0% did not. For cleaning between teeth, 75.0% selected toothpicks, 20.0% matchsticks, 3.5% thread, and 1.5% dental floss. Regarding dental attendance, 7.5% reported monthly visits, 10.0% visits every six months, 30.0% annual visits, and 52.5% did not know the interval (Table 4).

Table 4: Knowledge of mouthwash, interdental cleaning, and dental visits (n=200).

Indicator	Response	n	%
Mouthwash	Know about mouthwash	60	30.0
	Do not know	140	70.0
Interdental cleaning	Toothpick	150	75.0
	Matchstick	40	20.0
	Dental floss	3	1.5
	Thread	7	3.5
Dental visits	Monthly	15	7.5
	Every 6 months	20	10.0
	Annually	60	30.0
	Don't know	105	52.5

Dietary Knowledge and Related Practices

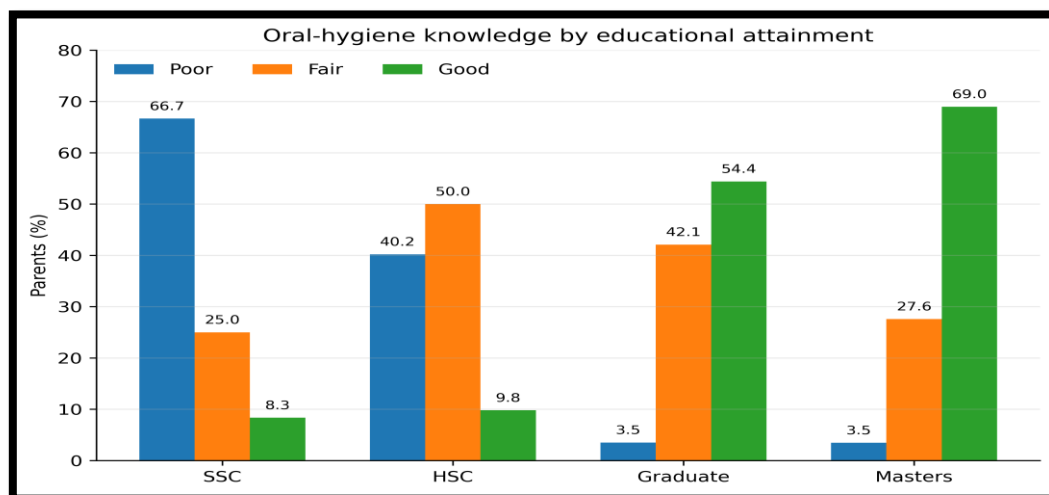
Table 5 presents respondents' dietary practices and perceptions related to dental caries. When asked which food items were associated with tooth decay, more than half of the respondents (58.5%) reported not knowing, while 27.5% identified sweetened food, 12.0% identified soft drinks, and only 2.0% identified milk. Regarding the frequency of sweetened food consumption, the majority (75.0%) reported consuming sweetened foods 1-2 times per week, while 15.0% consumed them more than three times per week and 10.0% consumed them daily. With respect to oral hygiene behaviour, only 15.0% of respondents reported cleaning their teeth after each meal, whereas the majority (85.0%) did not. Additionally, a substantial proportion of respondents (72.5%) reported consuming snacks between meals, compared to 27.5% who did not.

Table 5: Dietary Practices and Perceptions Related to Dental Caries among Respondents (n=200).

Indicator	Response	n	%
Food associated with decay	Sweetened food	55	27.5
	Soft drink	24	12.0
	Milk	4	2.0
	Don't know	117	58.5
Sweetened foods	Daily	20	10.0
	1-2 times/week	150	75.0
	>3 times/week	30	15.0
Clean after each meal	Yes	30	15.0
	No	170	85.0
Snacks between meals	Yes	145	72.5
	No	55	27.5

Overall Oral-Hygiene Knowledge

Overall, 52 respondents (26.0%) were classified as having poor knowledge, 86 (43.0%) fair knowledge, and 62 (31.0%) good knowledge. The distribution differed descriptively across educational groups. Good knowledge was reported among 1 of 12 respondents with SSC education (8.33%), 10 of 102 with HSC education (9.80%), 31 of 57 graduates (54.39%), and 20 of 29 respondents with master's education (68.97%). **Figure 1** shows the overall distribution and descriptive gradient across educational groups.

**Figure 1: Overall distribution of oral hygiene knowledge among parents with educational attainment (n=200).**

Note: Knowledge level categorized per Bloom's cut-off criteria (Good $\geq 80\%$, Fair 60-79%, Poor $< 60\%$) (Bloom et al., 1956). Percentages are calculated within each education-level row.

Figure 2 summarizes the oral hygiene knowledge indicators, showing that the largest gap was parents' understanding of fluoride toothpaste's purpose, unknown to 95.0% of respondents, followed by uncertainty about their toothpaste's fluoride content (53.0%), and the recommended dental-visit interval (52.5%). Nearly one-third (30.5%) of parents did

not know the correct brushing technique, and most (72.5%) failed to identify sweetened foods as a cause of dental decay. These findings indicate that conceptual knowledge gaps, particularly regarding fluoride's protective role and dietary risk factors, were more prevalent than procedural gaps, such as brushing technique.

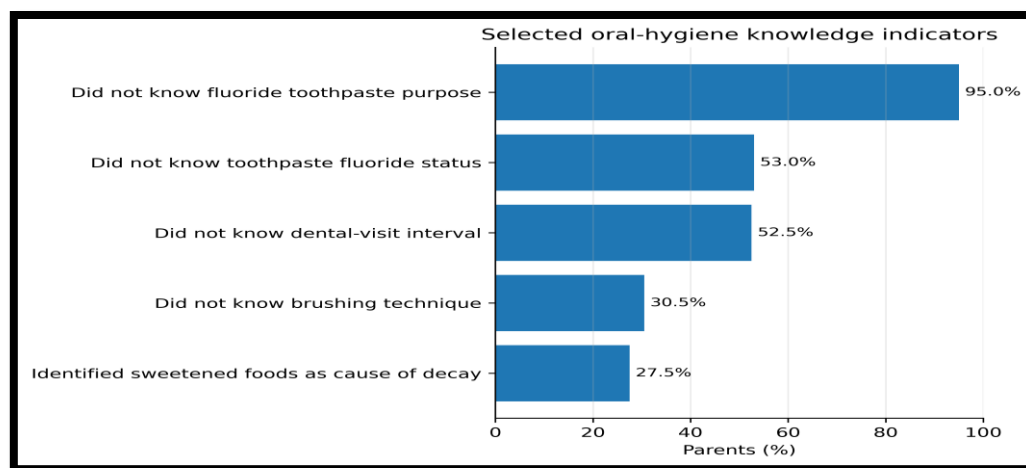


Figure 2: Selected oral hygiene knowledge indicators demonstrating major knowledge gaps.

DISCUSSION

The present study demonstrates substantial gaps in parental oral hygiene knowledge despite widespread use of toothbrushes and toothpaste. Only 31.0% of respondents were classified as having good overall knowledge, while 43.0% had fair and 26.0% poor knowledge. The pattern is important from a preventive-health perspective because parents are responsible for many of the daily decisions that shape children's oral-health behaviours. The findings therefore identify a practical target for intervention rather than simply describing a burden of disease.

The most immediate gap concerned tooth brushing. Although 91.5% reported using a toothbrush and toothpaste, only 34.5% reported brushing twice daily and only 5.5% selected the 2-3 minute duration specified by the questionnaire. Moreover, 30.5% did not know a brushing technique. The contrast between high ownership/use of basic oral hygiene materials and limited knowledge of how they should be used suggests that access to products alone is insufficient. Parent education should therefore be practical and skills-oriented rather than restricted to general messages about keeping teeth clean.

Fluoride knowledge was particularly limited. More than half of respondents did not know whether their toothpaste contained fluoride, and 95.0% did not know its preventive purpose. This finding is relevant because fluoride toothpaste is among the most established population-level preventive interventions for dental caries [9]. The finding does not establish that respondents were using non-fluoride toothpaste; rather, it indicates limited awareness of fluoride content and its role. Future educational interventions should therefore explain fluoride in simple terms and emphasize appropriate use of fluoridated toothpaste.

Interdental cleaning knowledge was also poor. Three-quarters of respondents selected toothpicks and one-fifth matchsticks for cleaning between teeth, while only 1.5% selected dental floss, a pattern consistent with previous Bangladeshi research showing limited awareness of dental floss and reliance on improvised objects for interdental cleaning [6]. The questionnaire did not collect sufficient clinical information to determine whether any respondent used these methods safely or whether the reported method was actually performed routinely. Accordingly, the result should be interpreted as a knowledge/practice indicator rather than evidence of clinical injury. It nevertheless indicates a clear opportunity for oral-health professionals to demonstrate appropriate interdental-care options.

Dietary knowledge showed another important deficit. Only 27.5% identified sweetened foods as a cause of tooth decay and 58.5% did not know which listed food was associated with dental disease. In addition, 72.5% reported snacks between meals and 85.0% reported that children did not clean their teeth after each regular meal. Although the cross-sectional design cannot establish that these behaviours caused dental disease in the children, the findings are consistent with the need for family-level counselling on sugar exposure, snack frequency and preventive oral hygiene [10]

The descriptive association between educational attainment and overall knowledge was striking. Good knowledge was reported in 8.33% of respondents with SSC education compared with 54.39% among graduates and 68.97% among respondents with master's education. This pattern is compatible with the broader literature suggesting that parental education and socioeconomic circumstances can shape oral-health knowledge and behaviours [11,12].

The findings of the present study are also relevant to the public-health context of Bangladesh. Evidence from a school-based oral-health education intervention among adolescents in Bangladesh demonstrated that structured oral-health education can improve knowledge, attitudes, and practices and may also contribute to a reduction in untreated dental caries. In that study, conducted among students in grades 6-8, participants who received the intervention showed significant improvements in oral-health knowledge, attitudes, and practices during follow-up [7]. These findings support the potential value of structured and repeated oral-health education within school settings in Bangladesh. More recent evidence from Dhaka also indicates that important gaps in parental oral-health knowledge persist. A cross-sectional study conducted among 400 mothers of children aged 5-9 years reported that 41.3% of mothers were categorized as having good knowledge of their children's oral hygiene, while 18.5% had poor knowledge [3]. However, the findings of that study should not be compared directly with those of the present study in numerical terms because the study populations, questionnaires, scoring procedures, sampling approaches, and study settings differed. Nevertheless, taken together, the findings suggest that gaps in parents' specific oral-health knowledge remain an important public-health concern in Bangladesh.

The practical implication is that oral-health promotion strategies should engage parents and caregivers as active participants. Parents influence children's oral-health behaviours through their own practices, supervision, and decisions concerning toothbrushing, diet, and use of dental services. A systematic review has reported that the family environment and parental oral-health behaviours are important determinants of

children's oral-health [13]. Similarly, a systematic review of parental oral-health literacy found that lower parental oral-health literacy was associated with greater dental caries experience among children [11]. Therefore, interventions should move beyond general awareness and provide parents with specific, practical, and behaviour-oriented information.

Hospital outpatient encounters may provide an opportunity for brief, structured oral-health counselling, particularly where parents are already attending healthcare facilities with their children. Schools can provide repeated reinforcement through classroom-based health education, supervised toothbrushing demonstrations, practical instruction on oral hygiene, and appropriate referral pathways for children requiring dental assessment. Evidence from systematic reviews indicates that school-based oral-health education can improve children's oral-health knowledge and selected oral hygiene behaviours, including toothbrushing practices and use of fluoride toothpaste [14,15]. More recent evidence from an umbrella review likewise indicates beneficial effects of school-based oral-health education on knowledge, attitudes, behaviours, plaque control, and gingival health, although evidence for caries prevention remains less conclusive [16]. Community-based programmes and appropriately designed mass-media messages may complement these school- and healthcare-based approaches.

Digital approaches may also have a role in future oral-health promotion programmes. A systematic review evaluating mobile-health interventions directed at parents found low- to very-low-certainty evidence that mHealth approaches may improve parental oral-health knowledge and some child-brushing behaviours; however, the included studies generally had a high risk of bias and evidence for broader child oral-health outcomes remained limited [17]. Thus, digital education should be considered a complementary rather than a replacement strategy and should be evaluated within the Bangladeshi context before large-scale implementation.

CONCLUSION

Among parents of primary school-going children attending the outpatient department of the selected hospital, oral-health knowledge was suboptimal, with only 31.0% demonstrating good knowledge, while 43.0% and 26.0% exhibited fair and poor knowledge, respectively. Notable gaps were identified in key domains, including twice-daily brushing, brushing duration and technique, use of fluoride toothpaste, interdental cleaning, recognition of dietary risk factors, and preventive dental attendance. A clear descriptive gradient was observed between educational attainment and overall oral-health knowledge, underscoring the influence of parental education on health literacy. These findings highlight the need for parent-centred oral-health education, complemented by school- and community-based preventive services, as a public health priority to improve children's oral-health outcomes.

Ethical Considerations

The study was approved by the ethical committee of the University of South Asia, and permission was granted by the hospital authorities. Written informed consent was obtained from all participants prior to enrolment.

Consent for Publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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