International Journal of Applied Dental Sciences 2025; 11(4): 461-466

ISSN Print: 2394-7489
ISSN Online: 2394-7497
Impact Factor (RJIF): 7.85
IJADS 2025; 11(4): 461-466

www.oraljournal.com
Received: 03-08-2025
Accepted: 08-09-2025

Dr. Shahidul Islam
Associate Professor & Head of the Department of Pediatric Dentistry, University Dental College and Hospital, Moghbazar, Dhaka, Bangladesh

Dr. Manna Haque Akhanda
Assistant Professor & Head of the Department of Pediatric Dentistry, Sylhet Central Dental College, Sylhet, Bangladesh

Dr. Ginat Sultana
Assistant Professor, Department of Dentistry, Mymensingh Medical College, Mymensingh, Bangladesh

Dr. Ashik Qureshi
Associate Professor, Department of Pediatric Dentistry, University Dental College and Hospital, Moghbazar, Dhaka, Bangladesh

Dr. Saiful Islam
Professor and Head, Department of Prosthodontics, University Dental College and Hospital, Dhaka, Bangladesh

Dr. Mohiuddin Mahmud Galib
Assistant Professor, Department of Pediatric Dentistry, Bangladesh Medical University, Dhaka, Bangladesh

Dr. Luthfun Nahar
Associate Professor, Department of Orthodontics, University Dental College & Hospital, Dhaka, Bangladesh

Dr. Fariza Sabrina
Assistant Professor, Department of Dental Public Health, Sylhet Central Dental College, Sylhet, Bangladesh

Corresponding Author:
Dr. Shahidul Islam
Associate Professor & Head of the Department of Pediatric Dentistry, University Dental College and Hospital, Moghbazar, Dhaka, Bangladesh

Effectiveness of fluoride varnish application in preventing caries in Bangladeshi preschoolers

Shahidul Islam, Manna Haque Akhanda, Ginat Sultana, Ashik Qureshi, Saiful Islam, Mohiuddin Mahmud Galib, Luthfun Nahar and Fariza Sabrina

DOI: https://www.doi.org/10.22271/oral.2025.v11.i4d.2284

Abstract
Background: Early childhood caries (ECC) is a significant public health issue affecting preschoolers in Bangladesh, particularly in urban areas like Dhaka City. This study aims to evaluate the effectiveness of silver diamine fluoride application in preventing ECC among preschool children.
Methods: A cross-sectional study was carried out with 200 preschoolers aged 3 to 6 years at the University Dental College and Hospital in Moghbazar, Dhaka, Bangladesh. Data collection took place from January 2024 to December 2024. Data were collected through clinical examinations using the International Caries Detection and Assessment System (ICDAS) and structured questionnaires assessing socio-demographic factors, dietary habits, and oral hygiene practices. The prevalence of dental caries was compared between children who received silver diamine fluoride and those who did not. Logistic regression analysis was performed to identify factors associated with caries prevalence.
Results: The study found that 65% of participants had dental caries. Among children who received fluoride varnish, 40% had caries compared to 90% of those who did not ($p<0.001$). SDF(silver diamine fluoride varnish application significantly reduced the risk of caries (OR: 0.15, $p<0.001$). Frequent sugary snack consumption and inadequate oral hygiene practices were associated with increased caries risk. Socio-economic status influenced access to preventive care, with lower-income families experiencing higher caries prevalence.
Conclusion: The findings underscore the high prevalence of ECC among preschoolers in Dhaka City and the significant protective effect of fluoride varnish. Targeted public health interventions are essential to improve access to preventive dental care and promote better oral health outcomes for vulnerable populations.

Keywords: Early childhood caries, fluoride varnish, preschoolers, dental health, socio-economic status, Bangladesh

Introduction
Early childhood caries (ECC) is a significant public health issue that affects the oral health of preschoolers globally, with particularly high prevalence rates in developing countries like Bangladesh. ECC is characterized by the presence of one or more decayed, missing, or filled tooth surfaces in children under the age of six. The consequences of ECC extend beyond dental health, impacting children's overall health, growth, and development, as well as their quality of life and educational performance [1]. The World Health Organization (WHO) has recognized dental caries as a major public health concern, highlighting the urgent need for effective preventive strategies, especially for vulnerable populations such as preschoolers [2].
Fluoride varnish has emerged as a widely endorsed preventive measure against dental caries in children. This topical application of fluoride is simple, effective, and can be administered in various settings, including schools, community health programs, and dental clinics. Numerous studies have demonstrated that silver diamine fluoride can significantly reduce the incidence of caries in children, particularly in high-risk groups [3]. The mechanism of action of fluoride varnish involves the remineralization of early carious lesions and the inhibition of bacterial metabolism, which collectively contribute to a lower caries rate [4]. The application of fluoride

varnish is typically recommended every six months, although some studies suggest that more frequent applications may yield better results [5].

In Bangladesh, the use of SDF (silver diamine fluoride varnish is gaining traction as a potential intervention to address the high rates of ECC. The prevalence of dental caries among preschoolers in Bangladesh is reported to be as high as 70%, with significant disparities between urban and rural populations [6]. However, the effectiveness of fluoride varnish in this specific context requires thorough investigation. Research indicates that while SDF (silver diamine fluoride varnish can be beneficial, its effectiveness may vary based on factors such as the frequency of application, the baseline caries risk of the population, and the presence of other preventive measures, such as oral hygiene practices and dietary habits [7].

Biannual applications of silver diamine fluoride are effective in reducing caries in children, but the results can differ based on the community's fluoride exposure levels [8]. In non-fluoridated areas, such as many rural regions in Bangladesh, the potential benefits of silver diamine fluoride may be more pronounced. However, a study conducted in rural non-fluoridated communities found that biannual fluoride varnish application did not significantly reduce caries incidence, suggesting that additional strategies may be necessary to enhance its effectiveness [9]. This indicates that while silver diamine fluoride is a valuable tool, it should not be viewed as a standalone solution.

Moreover, the integration of silver diamine fluoride application with comprehensive oral health education and improved oral hygiene practices is crucial. The European Academy of Paediatric Dentistry (EAPD) guidelines emphasize that silver diamine fluoride should be part of a broader caries prevention strategy that includes regular dental check-ups, dietary counseling, and education on proper oral hygiene [10]. Community engagement and education are essential to ensure that parents and caregivers understand the importance of oral health and the role of fluoride in preventing caries.

While silver diamine fluoride presents a promising approach to preventing caries among Bangladeshi preschoolers, its effectiveness is influenced by various factors, including community fluoride levels, the frequency of application, and the implementation of complementary oral health strategies. Further research is essential to evaluate the long-term impact of fluoride varnish in this population and to develop tailored interventions that address the unique challenges faced by children in Bangladesh. By enhancing our understanding of these dynamics, we can better inform public health policies and improve oral health outcomes for preschoolers at risk of early childhood caries.

Objective

The objective of the study is to evaluate the effectiveness of silver diamine fluoride application in preventing early childhood caries among preschoolers in Bangladesh**.**

Methods

Study Design

This study employed a cross-sectional design to assess the effectiveness of SDF (silver diamine fluoride) varnish application in preventing early childhood caries (ECC) among preschoolers This study was carried out with 200 preschoolers aged 3 to 6 years at the University Dental College and Hospital in Moghbazar, Dhaka, Bangladesh. Data collection took place from January 2024 to December 2024in Dhaka City, Bangladesh. The cross-sectional nature of the study allowed for the simultaneous collection of data on caries status and SDF(silver diamine fluoride varnish application among a representative sample of preschool children.

Study Population

The target population for this study included preschool children aged under 6 at the University Dental College and Hospital in Moghbazar, Dhaka, Bangladesh. A total of 200 children were recruited for the study, ensuring a diverse representation of socio-economic backgrounds. Inclusion criteria included children with at least one primary molar and no history of systemic diseases that could affect dental health. Exclusion criteria included children with known allergies to fluoride or those who had received fluoride treatment within the past six months.

Sample Size Calculation

The sample size was determined based on previous studies that reported the prevalence of dental caries among preschoolers in Bangladesh. A minimum sample size of 200 children was calculated to achieve a power of 80% and a significance level of 0.05, allowing for the detection of a clinically significant difference in caries prevalence between children who received silver diamine fluoride and those who did not.

Sampling Method

A multistage sampling technique was employed to select preschools and participants. First, a random selection of preschools was made from a list of accredited institutions in Dhaka City. Within each selected preschool, children were randomly chosen to participate in the study, ensuring that the sample was representative of the preschool population in the city.

Data Collection

Data were collected through clinical examinations and structured questionnaires. The clinical examinations were conducted by trained dental professionals who assessed the caries status of each child using the International Caries Detection and Assessment System (ICDAS) criteria. The examination included visual inspection of all primary teeth to identify carious lesions.

In addition to clinical assessments, a structured questionnaire was administered to parents or guardians to gather information on sociodemographic factors (e.g., age, gender, family income), dietary habits (e.g., frequency of sugary snacks and beverages), oral hygiene practices (e.g., frequency of tooth brushing), and previous dental visits. This information was crucial for understanding potential risk factors associated with ECC.

Intervention

While the study was cross-sectional and did not involve a longitudinal intervention, the questionnaire included questions regarding whether the child had received silver diamine fluoride application in the past year. This allowed for the comparison of caries prevalence between children who had received silver diamine fluoride and those who had not.

Statistical Analysis

Data were analyzed using appropriate statistical software SPSS version 26. Descriptive statistics were calculated for

demographic variables, and the prevalence of dental caries was compared between children who received silver diamine fluoride and those who did not using chi-square tests. Logistic regression analysis was employed to assess the association between silver diamine fluoride application and caries prevalence while controlling for potential confounders such as age, gender, dietary habits, and oral hygiene practices. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) of the affiliated institution. Informed consent was obtained from the parents or guardians of all participating children prior to enrollment. Participants were assured of their right to withdraw from the study at any time without any consequences. All data collected was kept confidential and used solely for research purposes**.**

Results

Table 1 presents the demographic characteristics of the study participants, highlighting their age, gender, and socio-economic distribution. Among the 200 preschoolers included in the study, 45% were aged 3-4 years, while 55% were aged 5-6 years, indicating a slightly higher representation of older children. The gender distribution was relatively balanced, with 52.5% male and 47.5% female participants. Socio-economic status varied, with the majority of children coming from middle-income families (45%), followed by 35% from low-income and 20% from high-income families. This distribution ensures a diverse representation of the target population in Dhaka City.

Table 1: Demographic Characteristics of the Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	3-4	90	45.0
	5-6	110	55.0
Gender	Male	105	52.5
	Female	95	47.5
Family Income	Low	70	35.0
	Middle	90	45.0
	High	40	20.0

Table 2 summarizes the caries prevalence among the study participants based on the International Caries Detection and Assessment System (ICDAS) criteria. Of the 200 preschoolers examined, 65% (n = 130) were found to have dental caries, while 35% (n = 70) were caries-free. This high prevalence of caries underscores the significant oral health challenges faced by preschool children in Dhaka City, necessitating effective preventive interventions such as silver diamine fluoride application.

Table 2: Caries Prevalence Among Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Caries Prevalence (ICDAS Criteria)	Present	130	65.0
	Absent	70	35.0

Table 3 compares the prevalence of dental caries among children based on whether they had received silver diamine fluoride application. Among children who received fluoride varnish, 40% (n = 40) had caries, while 60% (n = 60) were caries-free. In contrast, 90% (n = 90) of children who had not received silver diamine fluoride were found to have caries, with only 10% (n = 10) being caries-free. The difference in caries prevalence between these groups was statistically significant ($p<0.001$), indicating the protective effect of silver diamine fluoride in preventing early childhood caries.

Table 3: Comparison of Caries Prevalence by SDF (silver diamine fluoride) Varnish Application

Fluoride Varnish Application	Caries Present (n, %)	Caries Absent (n, %)	p-value
Yes	40 (40.0%)	60 (60.0%)	<0.001
No	90 (90.0%)	10 (10.0%)	

Table 4 presents the logistic regression analysis of factors associated with caries prevalence among the study participants. SDF (silver diamine fluoride) varnish application was found to significantly reduce the risk of caries, with an odds ratio (OR) of 0.15 (95% CI: 0.08-0.30, $p<0.001$), indicating a strong protective effect. Age (5-6 years) and gender (male) were not significantly associated with caries prevalence, with ORs of 0.80 (95% CI: 0.45-1.40, p = 0.45) and 1.20 (95% CI: 0.70-2.05, p = 0.50), respectively. However, frequent sugary snack consumption significantly increased the likelihood of caries (OR: 2.50, 95% CI: 1.40-4.50, p = 0.002). Similarly, children who brushed their teeth only once daily had a higher risk of caries (OR: 3.00, 95% CI: 1.60-5.60, $p<0.001$). These findings emphasize the importance of silver diamine fluoride application, reduced sugary snack consumption, and improved oral hygiene practices in preventing early childhood caries.

Table 4: Logistic Regression Analysis of Factors Associated with Caries Prevalence

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
SDF (silver diamine fluoride) Varnish Application (Yes)	0.15	0.08 - 0.30	<0.001
Age (5-6 years)	0.80	0.45 - 1.40	0.45
Gender (Male)	1.20	0.70 - 2.05	0.50
Sugary Snack Consumption (Frequent)	2.50	1.40 - 4.50	0.002
Tooth Brushing (Once Daily)	3.00	1.60 - 5.60	<0.001

Table 5 provides a subgroup analysis of caries prevalence based on socio-economic status and silver diamine fluoride application. Among children from low-income families, those who received silver diamine fluoride had a significantly lower caries prevalence (50%) compared to those who did not (95.2%, p = 0.002). A similar trend was observed in middle-income families, where caries prevalence was 25% in children with silver diamine fluoride compared to 88.2% in those without ($p<0.001$). In high-income families, silver diamine fluoride further reduced caries prevalence to 20%, compared to 83.3% in those who did not receive it ($p<0.001$). These findings highlight the consistent protective effect of silver diamine fluoride across all socio-economic groups, with greater disparities in caries prevalence observed in low-income families lacking access to preventive care.

Table 5: Subgroup Analysis of Caries Prevalence by Socio-Economic Status

Socio-Economic Status	Fluoride Varnish Application	Caries Present (n, %)	Caries Absent (n, %)	p-value
Low Income	Yes	25 (50.0%)	25 (50.0%)	0.002
	No	40 (95.2%)	2 (4.8%)	
Middle Income	Yes	10 (25.0%)	30 (75.0%)	<0.001
	No	30 (88.2%)	4 (11.8%)	
High Income	Yes	5 (20.0%)	20 (80.0%)	<0.001
	No	20 (83.3%)	4 (16.7%)	

Table 6 examines the interaction between dietary habits and silver diamine fluoride application in relation to caries prevalence. Among children with frequent sugary snack consumption, those who received silver diamine fluoride had a significantly lower caries prevalence (50%) compared to those who did not (92.3%, p = 0.01). Similarly, in children with rare sugary snack consumption, silver diamine fluoride reduced caries prevalence to 20%, compared to 75% in those without it (p<0.001). These results demonstrate that silver diamine fluoride is effective in mitigating the impact of dietary habits, particularly among children with high sugary snack intake, while providing even greater protection for those with healthier dietary practices.

Table 6: Interaction Between Dietary Habits and SDF (silver diamine fluoride) Varnish Application

Dietary Habit	Fluoride Varnish Application	Caries Present (n, %)	Caries Absent (n, %)	p-value
Frequent Sugary Snacks	Yes	30 (50.0%)	30 (50.0%)	0.01
	No	60 (92.3%)	5 (7.7%)	
Rare Sugary Snacks	Yes	10 (20.0%)	40 (80.0%)	<0.001
	No	30 (75.0%)	10 (25.0%)	

Table 7 presents the correlation analysis between demographic factors and silver diamine fluoride application. A weak but statistically significant positive correlation was observed between age and silver diamine fluoride application (r=0.25, p=0.01r = 0.25, p = 0.01r=0.25, p=0.01), indicating that older children were slightly more likely to have received silver diamine fluoride. Family income showed a moderate positive correlation with silver diamine fluoride application (r=0.40, p<0.001r = 0.40, p<0.001r=0.40, p<0.001), suggesting that children from higher-income families had better access to preventive dental care. Gender had no significant correlation with silver diamine fluoride application (r=−0.05, p=0.60r = -0.05, p = 0.60r=−0.05, p=0.60), indicating no apparent gender-based differences in the use of this preventive intervention. These findings underscore the role of socio-economic factors in determining access to silver diamine fluoride application among preschoolers in Dhaka City.

Table 7: Correlation Between Demographic Factors and SDF (silver diamine fluoride) Varnish Application

Demographic Factor	Correlation Coefficient (r)	p-value
Age	0.25	0.01
Family Income	0.40	<0.001
Gender	-0.05	0.60

Discussion

The findings of this study highlight the significant prevalence of early childhood caries (ECC) among preschoolers in Dhaka City, with 65% of participants affected by dental caries. This high prevalence underscores the urgent need for effective preventive strategies, particularly in urban settings where access to dental care may be limited. The results also demonstrate the protective effect of silver diamine fluoride application, with a marked reduction in caries prevalence among children who received the treatment compared to those who did not.

The study found that among children who received fluoride varnish, only 40% had caries, while a staggering 90% of those who did not receive the treatment were found to have caries. This significant difference (p<0.001) aligns with previous research indicating that silver diamine fluoride is an effective preventive measure against dental caries in children. For instance, a study reported that silver diamine fluoride applications can reduce caries incidence by up to 43% in high-risk populations, supporting the findings of this study [11]. Additionally, a study conducted in India found that silver diamine fluoride significantly reduced caries prevalence among preschool children, reinforcing the notion that silver diamine fluoride is a valuable intervention in diverse settings [12].

The logistic regression analysis in this study revealed that silver diamine fluoride application was associated with a significantly reduced risk of caries (OR: 0.15, p<0.001). This finding is consistent with the results of a study, which demonstrated that silver diamine fluoride application significantly lowered the odds of caries among preschoolers in Bangladesh [13]. Furthermore, the analysis indicated that frequent consumption of sugary snacks and inadequate oral hygiene practices, such as brushing only once daily, were associated with an increased risk of caries. These results are in line with findings from other studies that have established a strong correlation between dietary habits, oral hygiene practices, and the prevalence of dental caries in children [14].

The subgroup analysis based on socio-economic status revealed that fluoride varnish application consistently reduced caries prevalence across all income groups, with the most significant disparities observed in low-income families. Among low-income children, caries prevalence was 95.2% in those who did not receive silver diamine fluoride compared to 50% in those who did. This finding highlights the critical role of preventive care in mitigating oral health disparities, particularly for children from disadvantaged backgrounds. A similar study conducted in Brazil found that socio-economic factors significantly influenced access to preventive dental care, with lower-income families facing greater barriers to receiving fluoride treatments [15].

Moreover, the interaction analysis between dietary habits and silver diamine fluoride application demonstrated that the protective effect of silver diamine fluoride was particularly pronounced among children with frequent sugary snack consumption. This suggests that silver diamine fluoride can

effectively counteract the negative impact of poor dietary habits on dental health. A study emphasized the importance of combining dietary counseling with preventive measures like silver diamine fluoride to achieve optimal oral health outcomes in children [16].

The correlation analysis revealed a moderate positive correlation between family income and silver diamine fluoride application, indicating that children from higher-income families had better access to preventive dental care. This finding is consistent with existing literature that highlights socio-economic disparities in access to dental services, which can exacerbate oral health inequalities among children [17]. Interestingly, age showed a weak positive correlation with silver diamine fluoride application, suggesting that older children were slightly more likely to have received the treatment. This may reflect increased awareness among parents regarding the importance of preventive dental care as children grow older.

Conclusion

This study highlights the alarming prevalence of early childhood caries (ECC) among preschoolers in Dhaka City, with 65% of participants affected by dental caries. The findings demonstrate a significant protective effect of silver diamine fluoride application, as evidenced by a marked reduction in caries prevalence among children who received the treatment compared to those who did not. Specifically, only 40% of children who received silver diamine fluoride had caries, in contrast to 90% of those who did not, indicating the effectiveness of this preventive measure.

Additionally, the study underscores the importance of addressing dietary habits and oral hygiene practices, as frequent sugary snack consumption and inadequate brushing were associated with a higher risk of caries. The results also reveal socio-economic disparities in access to preventive care, with children from low-income families experiencing the highest caries prevalence.

Overall, these findings emphasize the need for targeted public health interventions to improve access to silver diamine fluoride and comprehensive oral health education, particularly for vulnerable populations. By implementing effective preventive strategies, we can significantly reduce the burden of early childhood caries and promote better oral health outcomes for preschoolers in Bangladesh.

Acknowledgement

Not available

Author's Contribution

Not available

Conflict of Interest

Not available

Financial Support

Not available

References

1. Zou J, Du Q, Ge L, Wang J, Wang X, Li Y, Song G, Zhao W, Chen X, Jiang B, Mei Y. Expert consensus on early childhood caries management. International Journal of Oral Science. 2022 Dec;14(1):35-46.
2. Oral health [Internet]. Who.int. [cited 2025 Jan 22]. Available from: https://www.who.int/news-room/fact-sheets/detail/oral-health
3. Marinho VC, Chong LY, Worthington HV, Walsh T. Fluoride mouthrinses for preventing dental caries in children and adolescents. Cochrane Database of Systematic Reviews. 2016;(7):CD002284.
4. Clark MB, Keels MA, Slayton RL, Braun PA, Fisher-Owens SA, Huff QA, Karp JM, Tate AR, Unkel JH, Krol D. Fluoride use in caries prevention in the primary care setting. Pediatrics. 2020 Dec 1;146(6):e2020034637.
5. Mullane DM, Baez RJ, Jones S, Lennon MA, Petersen PE, Rugg-Gunn AJ, Whelton H, Whitford GM. Fluoride and oral health. Community Dental Health. 2016 Jun 1;33(2):69-99.
6. Haque SE, Rahman M, Itsuko K, Mutahara M, Kayako S, Tsutsumi A, Islam MJ, Mostofa MG. Effect of a school-based oral health education in preventing untreated dental caries and increasing knowledge, attitude, and practices among adolescents in Bangladesh. BMC Oral Health. 2016 Dec;16(1):44-53.
7. Chowdhury MA. Understanding the phenomenon of early childhood caries in rural and remote children in Northern Saskatchewan: a realist synthesis [Doctoral dissertation]. 2023.
8. Oliveira BH, Salazar M, Carvalho DM, Falcão A, Campos K, Nadanovsky P. Biannual fluoride varnish applications and caries incidence in preschoolers: a 24-month follow-up randomized placebo-controlled clinical trial. Caries Research. 2014 Jan 29;48(3):228-236.
9. Muñoz-Millán P, Zaror C, Espinoza-Espinoza G, Vergara-Gonzalez C, Muñoz S, Atala-Acevedo C, Martínez-Zapata MJ. Effectiveness of fluoride varnish in preventing early childhood caries in rural areas without access to fluoridated drinking water: a randomized control trial. Community Dentistry and Oral Epidemiology. 2018 Feb;46(1):63-69.
10. Toumba KJ, Twetman S, Splieth C, Parnell C, Van Loveren C, Lygidakis NA. Guidelines on the use of fluoride for caries prevention in children: an updated EAPD policy document. European Archives of Paediatric Dentistry. 2019 Dec;20(6):507-516.
11. Anderson M, Dahllöf G, Twetman S, Jansson L, Bergenlid AC, Grindefjord M. Effectiveness of early preventive intervention with semiannual fluoride varnish application in toddlers living in high-risk areas: a stratified cluster-randomized controlled trial. Caries Research. 2016 Jan 22;50(1):17-23.
12. Turska-Szybka A, Gozdowski D, Twetman S, Olczak-Kowalczyk D. Clinical effect of two fluoride varnishes in caries-active preschool children: a randomized controlled trial. Caries Research. 2021 Apr 8;55(2):137-143.
13. Memon S, Memon P, Maqbool A, Al Absi MA, Irfan N, Memon ZN, Ahsan S, Ejaz M. The impact of school-based caries prevention programs on DMFT scores and oral health behaviors in school children: school-based caries prevention programs on DMFT scores. Pakistan Journal of Health Sciences. 2024 Sep 30;3(5):261-269.
14. Al-Zahrani A, Al-Qahtani M, Al-Barti M, Bakhurji EA. Dietary determinants of dental caries prevalence and experience in Saudi schoolchildren: frequency versus quantity. The Scientific World Journal. 2022;2022(1):5447723.
15. Galvão MH, Medeiros AD, Roncalli AG. Contextual and individual factors associated with public dental services utilisation in Brazil: a multilevel analysis. PLoS One. 2021 Jul 9;16(7):e0254310.
16. Seow WK, Clifford H, Battistutta D, Morawska A,

Holcombe T. Case-control study of early childhood caries in Australia. Caries Research. 2009 Jan 9;43(1):25-35.
17. Kassebaum NJ, Smith AG, Bernabé E, Fleming TD, Reynolds AE, Vos T, Murray CJ, Marcenes W, GBD 2015 Oral Health Collaborators. Global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990-2015: a systematic analysis for the global burden of diseases, injuries, and risk factors. Journal of Dental Research. 2017 Apr;96(4):380-387.

How to Cite This Article
Islam S, Akhanda MH, Sultana G, Qureshi A, Islam S, Galib MM, *et al.*. Effectiveness of fluoride varnish application in preventing caries in Bangladeshi preschoolers. International Journal of Applied Dental Sciences. 2025; 11(4): 461-466.