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Original Research Article

Prevalence of Dental Caries among School-Going Children in Urban and Rural Areas of Bangladesh

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Abstract: ***Background***: Dental caries remains a major public health concern among children globally, with prevalence rates differing between urban and rural regions. This study aims to assess the prevalence of dental caries among school-going children in Jamalpur, Bangladesh, and identify associated risk factors. ***Methods*:** A cross-sectional study was conducted from January 2023 to December 2023 at the 250-bed General Hospital in Jamalpur. A total of 200 school-going children aged 6 to 12 years were recruited, with an equal distribution of 100 children from urban and 100 from rural areas. Data were collected through a structured questionnaire and clinical examinations to assess dental caries prevalence. ***Results*:** The overall prevalence of dental caries among participants was 68%. A significant difference was observed between urban (60%) and rural (76%) children ($\chi^2 = 6.25$, $p = 0.012$). Multivariate logistic regression analysis revealed that children whose parents had primary education or less (OR = 2.1, 95% CI: 1.3–3.4, $p = 0.002$), those from low socio-economic backgrounds (OR = 1.8, 95% CI: 1.1–3.0, $p = 0.015$), and those consuming sugary snacks more than three times a week (OR = 2.5, 95% CI: 1.5–4.2, $p < 0.001$) were at a higher risk of dental caries. Additionally, infrequent tooth brushing (less than twice daily) was significantly associated with dental caries (OR = 2.8, 95% CI: 1.6–4.8, $p < 0.001$). ***Conclusion*:** This study emphasizes the significant occurrence of dental caries among school-aged children in Jamalpur, with a higher prevalence in rural areas. Factors such as socio-economic status, dietary patterns, and oral hygiene habits play a crucial role in increasing the risk of dental caries. The results highlight the necessity for focused public health initiatives to enhance children's oral health in Bangladesh.

Keywords: Dental Caries, School Children, Socio-Economic Factors, Oral Hygiene, Bangladesh.

INTRODUCTION

Dental caries, a prevalent global health concern, significantly affects individuals of all ages, particularly children. This condition involves the breakdown of tooth structure due to acids produced by bacteria metabolizing sugars in the mouth. The World Health Organization (WHO) recognizes dental caries as a leading chronic disease, affecting an estimated 60% to 90% of school-aged children worldwide [1]. This issue is also a substantial problem for school children in Bangladesh, especially when comparing urban and rural areas.

Studies have documented the high prevalence of dental caries in urban Bangladesh. For example, research in Mymensingh revealed an 82.7% prevalence among children aged 8 to 10 [2]. Factors contributing to this high rate often include increased sugar intake, poor oral hygiene, and limited access to dental services. Urban children's greater exposure to sugary foods and drinks plays a significant role in caries development [3]. Furthermore, family socio-economic status influences access to preventative dental care and oral hygiene education, compounding the problem.

Rural Bangladesh also experiences a high prevalence of dental caries, sometimes exceeding urban rates. Children in rural areas face unique challenges impacting their oral health, including limited access to dental facilities, low oral hygiene awareness, and diets high in sugar and low in nutritional value [4]. A study in

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rural Sylhet found a significantly high prevalence of dental caries, with many children having untreated decay [5]. Dietary patterns in rural areas, often shaped by economic limitations, frequently involve inexpensive, high-sugar foods, further increasing caries risk.

Socio-economic disparities between urban and rural populations in Bangladesh strongly influence children's oral health. Lower socio-economic status often restricts access to dental care, resulting in untreated dental problems and higher caries prevalence [6]. Educational disparities also contribute to a lack of oral hygiene knowledge, crucial for caries prevention. Children from families with lower educational attainment are less likely to receive oral health guidance, leading to poor oral hygiene habits [7].

The impact of dental caries goes beyond oral health, affecting children's overall well-being, academic performance, and quality of life. Children with dental caries may experience pain, eating difficulties, and social stigma, potentially hindering school concentration and social participation [8]. Therefore, understanding dental caries prevalence among school children in both urban and rural Bangladesh is essential for creating effective public health interventions.

OBJECTIVE

This study aims to evaluate and compare the prevalence of dental caries in Bangladeshi schoolchildren residing in urban and rural areas, and to determine the associated risk factors.

METHODS

Study Design

A cross-sectional study was conducted in Jamalpur, Bangladesh, from January 2023 to December 2023, to determine the prevalence of dental caries among schoolchildren in urban and rural settings.

Study Setting

The research was conducted at the 250-bed General Hospital in Jamalpur, which serves as a primary healthcare facility for both urban and rural populations. The hospital provides a range of medical services, including dental care, making it an appropriate setting for this study.

Study Population

This study focused on school-going children aged 6 to 12 years from both urban and rural areas of Jamalpur. A total of 200 participants were selected, evenly divided with 100 children from urban regions and 100 from rural regions.

Sampling Method

Stratified random sampling was used to ensure representation from both urban and rural areas. Schools were randomly selected from each area, and parental/guardian consent was obtained before children participated in the study.

Data Collection

Data collection involved a structured questionnaire and clinical examinations. The questionnaire collected information on demographics, socioeconomic status, dietary habits, oral hygiene practices, and access to dental care. Trained dental professionals performed clinical assessments following standardized protocols to determine the presence of dental caries. These assessments were conducted according to World Health Organization (WHO) criteria, using visual inspection and a dental explorer to confirm carious lesions.

Data Analysis

Data was analyzed using statistical software SPSS version 26. Descriptive statistics are used to summarize the demographic characteristics and prevalence of dental caries. Comparative analyses were conducted to evaluate differences in caries prevalence between urban and rural children using chi-square tests. Multivariate logistic regression will be employed to identify potential risk factors associated with dental caries.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of the 250-bed General Hospital, Jamalpur. Informed consent was secured from parents or guardians of the participating children. Confidentiality and anonymity of the participants were maintained throughout the study.

RESULTS

This study investigated the prevalence of dental caries in 200 schoolchildren aged 6–12 years in urban and rural Jamalpur, Bangladesh, with 100 participants from each area. The average age was 9.2 years (SD = 1.8), and the sample comprised a near-equal number of males (51%) and females (49%). Overall, 68% of the children presented with dental caries. A statistically significant difference ($\chi^2 = 6.25$, $p = 0.012$) in caries prevalence was found between urban (60%) and rural (76%) children, with rural children exhibiting a higher prevalence (Table 1).

Table 1: The prevalence of dental caries was analyzed concerning various socio-demographic factors

Variable	Total (n = 200)	Caries Present (n = 136)	Caries Absent (n = 64)	p-value
Age Group				
6–8 years	80	52 (65%)	28 (35%)	0.45
9–12 years	120	84 (70%)	36 (30%)	
Residence				
Urban	100	60 (60%)	40(40%)	0.012*
Rural	100	76(76%)	24(24%)	
Gender				
Male	102	68 (67%)	34 (33%)	0.78
Female	98	68 (69%)	30 (31%)	
Parental Education				
Primary or less	110	85 (77%)	25 (23%)	0.003*
Secondary or higher	90	51 (57%)	39 (43%)	
Socio-Economic Status				
Low	120	90 (75%)	30 (25%)	0.01*
Middle/High	80	46 (58%)	34 (42%)	

***Statistically significant at $p < 0.05$**

Multivariate logistic regression analysis identified several factors significantly associated with the presence of dental caries among the study participants. Children whose parents had primary education or less were more likely to have dental caries compared to those whose parents had secondary or higher education (OR = 2.1, 95% CI: 1.3–3.4, p = 0.002). Additionally, children from low socio-economic backgrounds had a higher likelihood of experiencing dental caries than those from middle or high socio-economic statuses (OR = 1.8, 95% CI: 1.1–3.0, p = 0.015). Frequent consumption of sugary snacks (more than three times a week) was associated with a higher risk of dental caries (OR = 2.5, 95% CI: 1.5–4.2, p < 0.001). Furthermore, infrequent tooth brushing (less than twice daily) was significantly associated with the presence of dental caries (OR = 2.8, 95% CI: 1.6–4.8, p < 0.001). (Table 2)

Table 2: Risk Factors Associated with Dental Caries

Risk Factor	Adjusted Odds Ratio (AOR)	95% Confidence Interval (CI)	p-value
Parental Education			
Primary education or less	2.1	1.3–3.4	0.002
Secondary education or higher	1 (Reference)		
Socio-Economic Status			
Low	1.8	1.1–3.0	0.015
Middle/High	1 (Reference)		
Frequency of Sugary Snack Consumption			
More than three times a week	2.5	1.5–4.2	<0.001
Three times a week or less	1 (Reference)		
Oral Hygiene Practices			
Brushing less than twice daily	2.8	1.6–4.8	<0.001
Brushing twice daily or more	1 (Reference)		

Note: The reference category for each risk factor is indicated as "1 (Reference)."

DISCUSSION

This study in Jamalpur, Bangladesh, revealed a substantial 68% overall prevalence of dental caries among schoolchildren, consistent with other research in similar populations, thus emphasizing the urgent need for public health interventions. A statistically significant difference was observed between urban (60%) and rural (76%) children's caries prevalence. The majority of the children (84%) were between 9-12 years old, with a mean age of 9.2 years. While this study focused on the 9-12 age group, other studies have reported varying age distributions among child dental caries patients. For example, one study found that the majority of their respondents were between 8 and 10 years old [9], while another study in Bangladesh reported that approximately 34% of the participants were between 10-12 years old. Another study showed that most of the children were between 11 and 15 years old [10]. These variations in age distribution likely reflect the specific populations studied and may also align with broader demographic trends. For instance, data from the Bangladesh Bureau of Statistics indicates that the 10–14-year age group makes up 9.61% of the national population [11]. In the present study, most of the children (69%) were female. Children whose parents had primary education or less were more likely

to have dental caries compared to those whose parents had secondary or higher education (OR = 2.1, 95% CI: 1.3–3.4, p = 0.002). Similarly, children from low socio-economic backgrounds were more likely to have dental caries than those from middle or high socio-economic statuses (OR = 1.8, 95% CI: 1.1–3.0, p = 0.015). Frequent consumption of sugary snacks (more than three times a week) was associated with a higher risk of dental caries (OR = 2.5, 95% CI: 1.5–4.2, p < 0.001). Infrequent tooth brushing (less than twice daily) also demonstrated a significant association with dental caries (OR = 2.8, 95% CI: 1.6–4.8, p < 0.001). These findings are consistent with research elsewhere. A Malaysian study found that less frequent tooth brushing was associated with higher caries prevalence [12], and a Tanzanian study identified high sugar consumption, particularly from processed foods and drinks, as a significant risk factor [13].

CONCLUSION

In conclusion, the findings of this study underscore the critical need for comprehensive public health strategies aimed at reducing the prevalence of dental caries among school-going children in Jamalpur, particularly in rural areas. Interventions should focus on improving parental education, enhancing access to dental care, promoting healthy dietary habits, and encouraging regular oral hygiene practices. By addressing these factors, it is possible to improve oral health outcomes for children and reduce the burden of dental caries in Bangladesh.

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