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Original Article

Dental Caries Experience and Associated Factors Among Underprivileged Children Attending Community Dental Outreach Camps in Lahore, Pakistan

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ABSTRACT

Background: Dental caries remains a common preventable oral disease among children in socioeconomically disadvantaged communities, where limited access to preventive care, suboptimal oral hygiene, frequent sugar exposure, and low oral health literacy may increase untreated disease burden. Objective: To estimate the prevalence and severity of dental caries among underprivileged school-going children aged 5–15 years in an urban slum setting of Lahore, Pakistan, and to explore associations with selected behavioral and sociodemographic factors. Methods: This retrospective cross-sectional analysis used anonymized oral health screening data from 160 children who attended a previously conducted community dental outreach camp at Door of Awareness School, Lahore. Dental caries experience was assessed using DMFT for permanent teeth and DEFT for primary teeth. Demographic characteristics, brushing frequency, sugary snack intake, and parental education were recorded. Descriptive statistics were used to estimate prevalence and mean caries scores, while Chi-square tests assessed exploratory associations; $p < 0.05$ was considered statistically significant. Results: Overall, 112 children had dental caries, giving a prevalence of 70.0% (95% CI: 63.1–76.9). Mean DMFT was 1.42 ± 1.1 and mean DEFT was 2.08 ± 1.3, with decayed teeth forming the largest component of both indices. Caries prevalence was significantly associated with once-daily brushing ($p = 0.02$), sugary snack intake more than twice daily ($p = 0.01$), and illiterate parental education ($p = 0.04$). Conclusion: Dental caries was highly prevalent in this underserved pediatric population, with untreated decay forming the dominant disease component. School- and community-based preventive strategies integrating oral hygiene education, dietary counseling, parental engagement, and referral for dental care are needed. Keywords: Dental caries, DMFT index, DEFT index, oral hygiene, school children, urban slum, Pakistan.

INTRODUCTION

Dental caries remains one of the most common preventable chronic oral diseases affecting children worldwide and continues to impose a disproportionate burden on socioeconomically disadvantaged populations. It develops through a multifactorial process involving fermentable carbohydrate exposure, cariogenic biofilm, host susceptibility, oral hygiene behavior, fluoride exposure, and access to preventive and restorative dental care (1). Although dental caries is largely preventable, children living in low-resource urban environments remain especially vulnerable because poor sanitation, overcrowding, limited health literacy, dietary insecurity, and restricted access to dental services often coexist and reinforce oral health inequalities (2).

In low- and middle-income countries, rapid urbanization has contributed to the expansion of underserved slum communities where child health needs frequently exceed the capacity of formal health systems. Within these settings, oral health is often deprioritized despite its direct effect on pain, nutrition, school attendance, quality of life, and general wellbeing. Children from marginalized communities may experience untreated carious lesions for prolonged periods because preventive dental visits are uncommon, restorative care is unaffordable, and oral health education is limited. This burden is especially important during the mixed dentition period, when both primary and permanent teeth are susceptible to disease and when untreated decay may influence future oral health trajectories (3).

Available regional evidence suggests that dental caries is highly prevalent among children living in socioeconomically deprived communities, but Pakistan-specific community data remain limited, particularly for school-going children in urban slum settings. Existing literature from comparable low-resource populations has reported substantial caries experience and a high untreated decay component, indicating that children in such environments often present only after disease has progressed rather than receiving early preventive care (4). However, local evidence is still needed because dietary practices, parental education, oral hygiene behaviors, fluoride exposure, school environment, and access to dental outreach services may vary substantially across communities and influence disease distribution.

The population of interest in the present study consisted of underprivileged school-going children aged 5–15 years attending a community dental outreach screening camp in Lahore, Pakistan. The exposure context included behavioral and sociodemographic factors such as toothbrushing frequency, sugary snack consumption, and parental education, while the main outcome was dental caries experience measured using standardized DMFT and DEFT indices. This population is important because children in this age range represent both primary and permanent dentition stages, allowing assessment of caries burden across clinically relevant developmental periods. The study setting also provides an opportunity to generate evidence from children who may otherwise have limited contact with dental services outside outreach-based care.

Despite the recognized public health relevance of dental caries, there remains a knowledge gap regarding the prevalence and severity of dental caries among underprivileged school-going children in urban slum communities of Lahore, as well as the extent to which selected behavioral and parental factors are associated with caries presence in this group. Addressing this gap is necessary for planning school-based oral health education, preventive screening, referral pathways, and community-level interventions tailored to disadvantaged pediatric populations. Therefore, this retrospective cross-sectional analysis aimed to estimate the prevalence and severity of dental caries among underprivileged children aged 5–15 years attending a previously conducted oral health screening camp in Lahore, Pakistan, and to explore non-causal associations between caries prevalence and selected behavioral and sociodemographic factors.

MATERIALS AND METHODS

A retrospective cross-sectional analysis was conducted using anonymized oral health screening data collected during a previously conducted community dental outreach camp at Door of Awareness School, located in an urban slum area of Lahore, Pakistan. The study was designed to estimate the prevalence and severity of dental caries among underprivileged school-going children and to explore associations between caries presence and selected behavioral and sociodemographic factors. A cross-sectional design was appropriate because all clinical and questionnaire-based variables were recorded at a single screening encounter, allowing simultaneous assessment of dental caries status, oral hygiene practices, dietary behavior, and parental education within the target population (5).

The study population included school-going children aged 5–15 years who were enrolled at Door of Awareness School and attended the oral health screening camp. This age range was selected because it includes children with primary, mixed, and early permanent dentition, allowing assessment of both deciduous and permanent teeth through DEFT and DMFT indices. Children were eligible for inclusion if they were between 5 and 15 years of age, were present on the screening day, were enrolled at the participating school, and had parental or guardian consent for participation in the screening activity. Children were excluded if they had a systemic condition that could interfere with safe oral examination or alter dental presentation, were unable to cooperate adequately during clinical assessment, or were absent during the screening session.

Participants were selected through convenience sampling, whereby all eligible children present during the dental outreach camp were invited for screening. This approach was used because the data were obtained in a field-based outreach setting where participation depended on school attendance, consent availability, and feasibility of completing examinations within the camp schedule. Although a sample size of approximately 196 children was calculated using an expected prevalence of 50%, a 95% confidence level, and a 7% margin of error, data were available for 160 eligible children who attended and completed screening. The final analysis therefore included 160 children.

Data were collected using a structured oral health screening form adapted for field-camp use. The form recorded demographic characteristics, including age, gender, class, and locality; relevant medical history; behavioral variables, including toothbrushing frequency, method of oral cleaning, supervision of brushing, frequency of sugary snack intake, daily meal frequency, and water consumption; and sociodemographic information, including parental education. Clinical findings were recorded during oral examination and included dental caries status, DMFT and DEFT components, gingival condition, oral hygiene status, malocclusion, and dental fluorosis.

Dental caries experience was assessed using the DMFT index for permanent teeth and the DEFT index for primary teeth according to standardized oral health survey criteria. For permanent dentition, the number of decayed, missing due to caries, and filled teeth was recorded as the DMFT score. For primary dentition, the number of decayed, extracted due to caries, and filled teeth was recorded as the DEFT score. Dental caries prevalence was operationally defined as the presence of at least one decayed, missing/extracted due to caries, or filled tooth in either dentition. Caries severity was assessed using mean DMFT and DEFT scores. Gingival status was assessed using the Löe and Silness Gingival Index, oral hygiene status was assessed using the Simplified Oral Hygiene Index, malocclusion was classified according to Angle's classification, and dental fluorosis was assessed using Dean's Fluorosis Index (6).

Clinical examinations were performed by trained dental professionals under field conditions using sterile disposable mouth mirrors and probes with adequate natural light. Examiners were oriented to standardized diagnostic criteria before data collection to promote consistency in caries identification and recording of oral health indicators. The questionnaire and screening form were pilot-tested on a small group of children before final data collection to assess clarity, flow, and feasibility in the camp setting. Data quality was supported through use of a structured form, standardized clinical indices, examiner calibration, and review of completed forms for missing or inconsistent entries before data analysis.

The primary outcome variable was dental caries prevalence, expressed as the proportion of children with at least one affected tooth. Secondary outcome variables included mean DMFT and DEFT scores and the distribution of decayed, missing/extracted, and filled components. Exposure variables included age group, gender, brushing frequency, sugary snack consumption, and parental education. Brushing frequency was categorized as once daily or twice daily, sugary snack intake as more than two times per day or two times per day or less, and parental education as illiterate or primary education and above. Association analyses were treated as exploratory and were interpreted as non-causal because exposure and outcome data were measured at the same time.

Potential sources of bias were addressed through standardized clinical assessment, use of predefined diagnostic criteria, calibration of examiners, structured data collection, and anonymization before analysis. Selection bias was minimized within the outreach setting by inviting all eligible children present on the screening day; however, the convenience sampling strategy meant that children absent from school or without consent were not represented. Information bias was reduced by using trained examiners and standardized forms, while reporting bias in behavioral variables was limited by using simple, clearly defined response categories. Confounding was considered during interpretation, particularly for relationships involving diet, oral hygiene behavior, parental education, and caries status.

Data were entered, cleaned, and analyzed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize participant characteristics and oral health outcomes. Categorical variables were reported as frequencies and percentages, while continuous variables such as DMFT and DEFT scores were reported as means and standard deviations. Dental caries prevalence was presented with a 95% confidence interval. Chi-square tests were used to examine exploratory associations between categorical variables, including brushing frequency, sugary snack intake, parental education, gender, age group, and caries prevalence. Mean DMFT and DEFT scores were compared across demographic and behavioral categories using independent-samples t-tests or one-way analysis of variance where appropriate. A two-tailed p-value of less than 0.05 was considered statistically significant. Records with incomplete information for a specific variable were excluded from the corresponding analysis, while available complete data were retained for other analyses.

The study involved secondary analysis of anonymized data collected during a community oral health screening and education activity. Administrative permission was obtained from the collaborating organization, and ethical approval was obtained from the institutional ethics review process for analysis and reporting of anonymized screening data. Written informed consent was obtained from parents or guardians at the time of the original screening camp, and verbal assent was obtained from children in an age-appropriate manner. No personal identifiers were retained in the analytical dataset, and the study involved non-invasive oral examination and questionnaire-based assessment with minimal risk to participants. The analysis was conducted in accordance with accepted ethical principles for human participant research, including confidentiality, voluntary participation, and protection of participant privacy (7).

RESULTS

A total of 160 school-going children aged 5–15 years were included in the analysis. Overall, 112 children had dental caries, giving a caries prevalence of 70.0%. The estimated 95% confidence interval for overall prevalence was 63.1%–76.9%, indicating a high burden of caries in the screened population. Caries prevalence was slightly higher among females than males, with 55 of 76 females affected (72.3%) compared with 57 of 84 males (67.9%), but this difference was not statistically significant ($p = 0.52$). Across age groups, the highest prevalence was observed among children aged 9–11 years, where 46 of 64 children (71.9%) had caries, followed by 5–8 years with 41 of 58 children (70.7%) and 12–15 years with 25 of 38 children (65.8%); the difference across age groups was also not statistically significant ($p = 0.63$).

Table 1. Prevalence of Dental Caries by Gender and Age Group

Variable	Category	Total, n	Caries Present, n (%)	Caries Absent, n (%)	95% CI for Caries Prevalence	p-value
Overall	Total sample	160	112 (70.0)	48 (30.0)	63.1–76.9	—
Gender	Male	84	57 (67.9)	27 (32.1)	57.3–76.9	0.52
	Female	76	55 (72.3)	21 (27.7)	61.4–81.2	
Age group	5–8 years	58	41 (70.7)	17 (29.3)	58.0–80.8	0.63
	9–11 years	64	46 (71.9)	18 (28.1)	59.9–81.4	
	12–15 years	38	25 (65.8)	13 (34.2)	49.9–78.8	

The mean dental caries experience differed by dentition stage. The mean DMFT score for permanent teeth was 1.42 ± 1.1, while the mean DEFT score for primary teeth was 2.08 ± 1.3. Females had slightly higher mean scores than males for both permanent and primary dentition, with a mean DMFT of 1.47 ± 1.2 and mean DEFT of 2.25 ± 1.4, compared with 1.38 ± 1.0 and 1.94 ± 1.2 among males. Age-based patterns showed that mean DMFT increased with age, rising from 0.86 ± 0.8 among children aged 5–8 years to 2.12 ± 1.3 among those aged 12–15 years. In contrast, mean DEFT was highest among younger children aged 5–8 years at 2.38 ± 1.5 and declined to 1.28 ± 0.9 among children aged 12–15 years.

Table 2. Mean DMFT and DEFT Scores by Gender and Age Group

Variable	Category	Mean DMFT ± SD	Mean DEFT ± SD
Overall	Total sample	1.42 ± 1.1	2.08 ± 1.3
Gender	Male	1.38 ± 1.0	1.94 ± 1.2
	Female	1.47 ± 1.2	2.25 ± 1.4
Age group	5–8 years	0.86 ± 0.8	2.38 ± 1.5
	9–11 years	1.54 ± 1.1	1.96 ± 1.2
	12–15 years	2.12 ± 1.3	1.28 ± 0.9

The decayed component represented the largest proportion of both DMFT and DEFT scores. In permanent dentition, 82.4% of the DMFT burden consisted of decayed teeth, while missing teeth contributed 13.6% and filled teeth only 4.0%. A similar pattern was observed in primary dentition, where decayed teeth accounted for 88.7% of the DEFT burden, extracted teeth contributed 9.1%, and filled teeth accounted for 2.2%. These findings show that untreated decay formed the dominant component of caries experience in both dentitions.

Table 3. Distribution of DMFT and DEFT Components

Index	Decayed Component, %	Missing/Extracted Component, %	Filled Component, %
DMFT, permanent teeth	82.4	13.6	4.0
DEFT, primary teeth	88.7	9.1	2.2

Secondary oral health findings showed that 78 children (48.8%) had healthy gingiva, 68 (42.5%) had mild gingivitis, and 14 (8.8%) had moderate gingivitis. No severe gingivitis was reported. Oral hygiene assessment showed that 56 children (35.0%) had good oral hygiene, 72 (45.0%) had fair oral hygiene, and 32 (20.0%) had poor oral hygiene. Malocclusion was present in 29 children (18.1%), while 131 children (81.9%) had no malocclusion. Dental fluorosis was observed in 14 children (8.8%), whereas 146 children (91.2%) had no clinically evident fluorosis.

Table 4. Secondary Oral Health Indicators Among Study Participants

Parameter	Category	Frequency, n	Percentage, %
Gingival status	Healthy	78	48.8
	Mild gingivitis	68	42.5
	Moderate gingivitis	14	8.8
Oral hygiene status	Good	56	35.0
	Fair	72	45.0
	Poor	32	20.0
Malocclusion	Present	29	18.1
	Absent	131	81.9
Dental fluorosis	Present	14	8.8
	Absent	146	91.2

Exploratory association analysis showed statistically significant relationships between dental caries and selected behavioral and sociodemographic variables. Children who brushed once daily had higher caries prevalence than those who brushed twice daily, with caries present in 81 of 102 children (79.4%) who brushed once daily compared with 22 of 41 children (53.7%) who brushed twice daily ($p = 0.02$). The odds of caries were approximately 3.33 times higher among children brushing once daily compared with those brushing twice daily (OR = 3.33; 95% CI: 1.53–7.26). Sugary snack intake was also significantly associated with caries. Among children consuming sugary snacks more than twice daily, 66 of 80 (82.5%) had caries, compared with 46 of 78 (59.0%) among those consuming sugary snacks two times daily or less ($p = 0.01$). The odds of caries were approximately 3.28 times higher in the higher-frequency sugary snack group (OR = 3.28; 95% CI: 1.58–6.82). Parental education was also associated with caries prevalence. Children of illiterate parents had a caries prevalence of 84.4%,

compared with 63.0% among children whose parents had primary education or higher ($p = 0.04$), corresponding to an odds ratio of 3.17 (95% CI: 1.43–7.02).

Table 5. Exploratory Associations Between Selected Risk Factors and Dental Caries

Risk Factor	Category	Caries Present, n (%)	Caries Absent, n (%)	Odds Ratio	95% CI	p-value
Brushing frequency	Once daily	81 (79.4)	21 (20.6)	3.33	1.53–7.26	0.02
	Twice daily	22 (53.7)	19 (46.3)	Reference	—	
Sugary snack frequency	>2 times/day	66 (82.5)	14 (17.5)	3.28	1.58–6.82	0.01
	≤2 times/day	46 (59.0)	32 (41.0)	Reference	—	
Parental education	Illiterate	54 (84.4)	10 (15.6)	3.17	1.43–7.02	0.04
	Primary or higher	58 (63.0)	34 (37.0)	Reference	—	

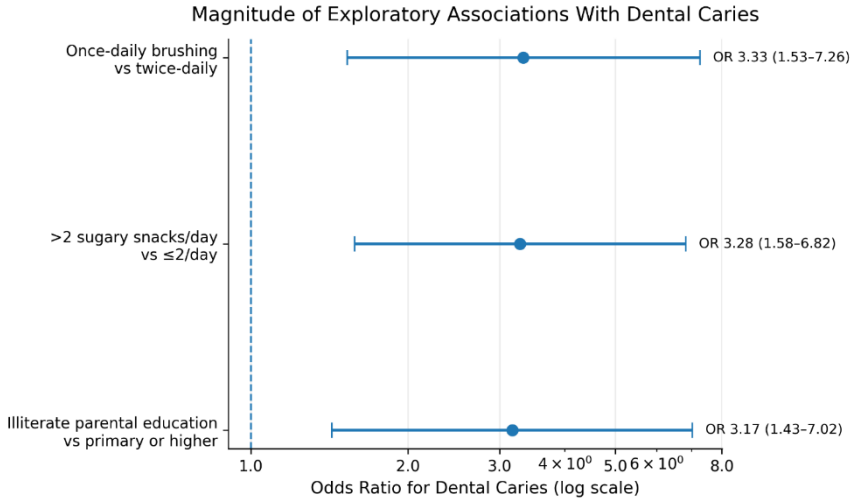

Figure 1. Magnitude of Exploratory Associations with Dental Caries

The exploratory association profile showed that all three assessed factors had odds ratios above the null value of 1.0, with confidence intervals excluding 1.0. Once-daily brushing was associated with approximately 3.33-fold higher odds of dental caries compared with twice-daily brushing (95% CI: 1.53–7.26). Children consuming sugary snacks more than twice daily had 3.28-fold higher odds of caries compared with those consuming sugary snacks two times daily or less (95% CI: 1.58–6.82). Illiterate parental education was associated with 3.17-fold higher odds of caries compared with primary-or-higher parental education (95% CI: 1.43–7.02), indicating that oral hygiene behavior, cariogenic dietary exposure, and parental educational status each showed clinically meaningful non-causal associations with dental caries burden in this population.

DISCUSSION

This retrospective cross-sectional analysis found a high burden of dental caries among underprivileged school-going children aged 5–15 years attending a community dental outreach setting in Lahore, Pakistan. Overall, 112 of 160 children had at least one carious tooth, giving a prevalence of 70.0%, with only modest variation by gender and age group. Females showed a slightly higher prevalence than males, but the difference was not statistically significant, and prevalence remained consistently high across all age categories. This pattern suggests that dental caries was not concentrated in one demographic subgroup alone but represented a broad oral health problem across the screened pediatric population. The high prevalence observed in this study is consistent with evidence from underserved urban and slum populations in low- and middle-income countries, where limited preventive care, delayed treatment-seeking, dietary risk exposure, and constrained access to restorative services contribute to a substantial oral disease burden (8-10).

The mean DMFT score of 1.42 ± 1.1 and mean DEFT score of 2.08 ± 1.3 indicate a clinically relevant caries experience affecting both permanent and primary dentition. The age-stratified pattern was biologically plausible: younger children aged 5–8 years had the highest mean DEFT score, while older children aged 12–15 years had the highest mean DMFT score. This reflects the transition from primary to permanent dentition during childhood and early adolescence, where untreated disease in primary

teeth remains prominent in younger children, while accumulated exposure to cariogenic conditions becomes increasingly visible in permanent teeth among older children (11). The higher DEFT burden in younger children also highlights the importance of early preventive interventions before the mixed dentition stage progresses and disease patterns become established.

A notable finding was the predominance of the decayed component within both indices. Decayed teeth accounted for 82.4% of the DMFT distribution and 88.7% of the DEFT distribution, whereas filled teeth contributed only 4.0% and 2.2%, respectively. This imbalance suggests that most caries experience reflected untreated active disease rather than previously treated lesions. In practical terms, this pattern points toward limited use of restorative dental services and a probable reliance on symptomatic or episodic care rather than routine prevention and early treatment. Similar patterns have been described in disadvantaged communities where dental visits are uncommon, cost and accessibility barriers are substantial, and oral health literacy may be limited (12,13). The low filled component is particularly important because it indicates that the measured caries burden was not merely historical but likely represented ongoing unmet treatment need.

Exploratory analyses showed statistically significant non-causal associations between caries prevalence and toothbrushing frequency, sugary snack intake, and parental education. Children who brushed once daily had higher caries prevalence than those who brushed twice daily, with an odds ratio of 3.33. This finding aligns with the biological role of oral hygiene in reducing plaque accumulation and limiting cariogenic biofilm activity (14,15). However, because brushing behavior and caries status were measured at the same time, the result should be interpreted as an association rather than evidence that brushing frequency alone caused the observed difference. Brushing quality, fluoride toothpaste use, parental supervision, access to toothbrushes, and prior dental education may also influence the relationship and were not fully captured in the available data.

Sugary snack consumption was also significantly associated with dental caries. Children consuming sugary snacks more than twice daily had 3.28-fold higher odds of caries compared with those consuming sugary snacks two times daily or less. This association is clinically plausible because frequent exposure to fermentable carbohydrates lowers plaque pH and promotes repeated cycles of enamel demineralization (16,17). In low-resource school environments, inexpensive sweet snacks and sugar-containing foods may be readily available, while structured oral health education and dietary counseling may be limited. The finding supports the relevance of dietary behavior as a modifiable risk marker, but it should be interpreted cautiously because frequency categories did not capture portion size, timing of intake, beverage consumption, total sugar exposure, or fluoride exposure.

Parental education was another important factor associated with caries prevalence. Children of illiterate parents had 3.17-fold higher odds of dental caries compared with children whose parents had primary education or higher. This association may reflect differences in oral health literacy, health-seeking behavior, supervision of brushing, ability to access preventive services, and awareness of dietary risk. In pediatric oral health, parental knowledge and practices strongly shape the child's hygiene routines, food choices, and dental care utilization. The observed association therefore supports the need for family-centered oral health education rather than child-only interventions (18). Nonetheless, parental education may also act as a marker for broader socioeconomic disadvantage, and the absence of multivariable adjustment limits the ability to separate its independent effect from related factors such as income, household conditions, and access to care.

Secondary oral health findings further support the presence of a broader preventive care gap. Nearly half of the children had mild or moderate gingivitis, and only 35.0% had good oral hygiene status, while 45.0% had fair and 20.0% had poor oral hygiene. These findings indicate that caries occurred within a wider context of suboptimal plaque control and gingival inflammation. Malocclusion and fluorosis were less common, affecting 18.1% and 8.8% of children, respectively, and appeared to represent secondary oral health concerns compared with the much larger burden of caries and

gingival inflammation (19). Together, these results suggest that school-based preventive programs should not focus only on caries detection but should also include oral hygiene instruction, supervised brushing promotion, dietary counseling, and referral pathways for children needing treatment.

The findings have practical implications for oral health planning in underserved school settings. A school-based model may be particularly suitable because it can reach children who otherwise have limited contact with dental services. Preventive strategies could include periodic oral screening, fluoride toothpaste promotion, supervised brushing sessions, parental counseling, teacher-supported oral health education, and referral linkages with dental colleges or community clinics. The strong untreated decay component also suggests that education alone would be insufficient; preventive and restorative service access must be strengthened simultaneously. Outreach camps can identify disease burden, but sustainable improvement requires continuity of care after screening, especially for children with active untreated lesions.

The main strength of this study is its focus on an underserved pediatric population in an urban slum setting, where community-based oral health data remain limited. The use of standardized DMFT and DEFT indices allowed structured assessment of both permanent and primary dentition, and the inclusion of behavioral and parental variables provided useful exploratory insight into modifiable risk markers. The study also generated clinically interpretable information that can support planning of targeted oral health interventions in similar low-resource school environments.

Several limitations should be considered when interpreting the findings. The retrospective cross-sectional design prevents causal inference because exposures and outcomes were assessed at the same time. Convenience sampling from children present at the screening camp may have introduced selection bias, and children absent from school or without consent may have differed in oral health status. The final sample of 160 was lower than the calculated target of 196, which may have reduced precision for subgroup comparisons. Behavioral variables such as brushing frequency and sugary snack intake were based on simplified categories and may be affected by recall or reporting bias. In addition, multivariable analysis was not performed, so potential confounding by socioeconomic status, fluoride exposure, access to dental care, parental practices, and other household-level factors could not be controlled. These limitations mean that the observed relationships should be interpreted as exploratory associations rather than independent predictors.

Overall, this study shows that dental caries was highly prevalent among underprivileged school-going children in the screened Lahore population, with untreated decay forming the major component of disease experience. The findings suggest that caries burden in this setting is associated with oral hygiene behavior, sugary snack intake, and parental educational status, while also occurring alongside gingival inflammation and suboptimal oral hygiene. These results support the value of integrated school- and community-based oral health strategies that combine early screening, preventive education, parental engagement, dietary counseling, and accessible referral for restorative care.

CONCLUSION

This retrospective cross-sectional analysis found a high prevalence of dental caries among underprivileged school-going children aged 5–15 years in an urban slum setting of Lahore, Pakistan, with 70.0% of participants affected and untreated decay forming the dominant component of both permanent and primary dentition caries experience. The mean DMFT score was 1.42 ± 1.1, while the mean DEFT score was 2.08 ± 1.3, with the decayed component accounting for 82.4% of DMFT and 88.7% of DEFT. Exploratory non-causal analyses showed that dental caries was significantly associated with once-daily toothbrushing, sugary snack consumption more than twice daily, and illiterate parental education, indicating that oral hygiene behavior, dietary exposure, and family-level educational factors are important markers of oral health vulnerability in this population. The findings support the need for integrated school- and community-based oral health strategies that combine routine screening,

supervised brushing education, fluoride toothpaste promotion, dietary counseling, parental involvement, and accessible referral pathways for preventive and restorative dental care among underserved children.

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