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Prevalence of Dental Caries and Its Association with Dietary Habits Among School-Going Children

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ABSTRACT:

Background: Dental caries had been recognized as one of the most common chronic oral diseases among school-going children and had shown a strong association with dietary habits, particularly frequent sugar intake and poor oral hygiene practices.

Aim: The aim of this study was to determine the prevalence of dental caries and to assess its association with dietary habits among school-going children.

Methodology: This cross-sectional study was conducted at Lahore General Hospital, Lahore, from April 2025 to March 2026. A total of 80 school-going children were included using a convenient sampling technique. Data regarding dietary habits, including frequency of sugar intake, consumption of soft drinks, and snacking patterns, were collected through a structured questionnaire. Oral examinations were performed to assess dental caries using the DMFT (Decayed, Missing, and Filled Teeth) index. The association between dietary habits and dental caries was analyzed.

Results: The prevalence of dental caries among the study population had been found to be 62.5%. A higher prevalence was observed in children who consumed sugary snacks more than three times per day (78.3%) compared to those with lower sugar intake (45.0%). Regular consumption of soft drinks was significantly associated with increased caries experience. The mean DMFT score was 2.8 ± 1.4, indicating a moderate level of caries burden among affected children.

Discussion: The findings had demonstrated a strong association between high sugar consumption and increased prevalence of dental caries among school-going children. Frequent intake of fermentable carbohydrates and inadequate oral hygiene practices had contributed significantly to caries development. These results were consistent with previously reported studies emphasizing dietary sugar as a major risk factor for dental decay in pediatric populations.

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Conclusion: Dental caries had been highly prevalent among school-going children and had shown a significant association with unhealthy dietary habits. Preventive strategies focusing on dietary modification and oral health education were strongly recommended.

Keywords: Dental caries, school-going children, dietary habits, sugar intake, DMFT index, oral health.

INTRODUCTION:

Dental caries had been recognized as one of the most prevalent chronic oral diseases affecting school-going children worldwide. It had remained a significant public health concern due to its high prevalence, multifactorial etiology, and long-term impact on oral and general health. The condition had been characterized by the demineralization of tooth enamel and dentin caused by acids produced by bacterial fermentation of dietary carbohydrates [1]. If left untreated, dental caries had led to pain, infection, difficulty in eating, impaired speech, and reduced quality of life. In children, it had also been associated with poor school attendance, decreased academic performance, and psychosocial stress.

Over the years, dietary habits had been identified as one of the most important modifiable risk factors influencing the development of dental caries. Frequent consumption of sugary foods and beverages, including candies, soft drinks, and processed snacks, had contributed significantly to the initiation and progression of carious lesions [2]. The role of fermentable carbohydrates in promoting acidogenic bacterial activity had been well established in dental literature. Additionally, irregular eating patterns, frequent snacking between meals, and inadequate consumption of protective foods such as fibrous fruits and dairy products had further increased caries susceptibility among children.

School-going children had been considered a particularly vulnerable group due to their developing dietary preferences, limited awareness of oral hygiene practices, and increased exposure to commercially available sugary foods. In many regions, especially in developing countries, nutritional transitions and urbanization had led to a marked increase in the availability and consumption of processed food items [3]. These changes in dietary behavior had been closely linked with a rising burden of dental caries in pediatric populations. Furthermore, inadequate parental supervision and lack of structured oral health education in schools had compounded the problem.

Various epidemiological studies had demonstrated a strong association between dietary habits and the prevalence of dental caries among children. Children who had frequently consumed sugar-rich diets had shown a significantly higher caries index compared to those with balanced diets. Conversely, those who had maintained proper oral hygiene practices along with limited sugar intake had demonstrated comparatively lower caries prevalence [4]. The protective role of fluoride exposure, whether through toothpaste or community water fluoridation, had also been acknowledged in reducing caries risk, although its effectiveness had often been influenced by dietary patterns.

In developing countries like Pakistan, dental caries had remained highly prevalent among school-going children, largely due to socioeconomic disparities, limited access to preventive dental care, and poor awareness regarding healthy dietary practices. School-based surveys had repeatedly highlighted a growing concern regarding excessive sugar consumption in children's daily diets [5]. Despite ongoing public health efforts, preventive strategies had remained insufficiently implemented at the community level, leading to persistent oral health challenges.

Given this background, the present study had been designed to evaluate the prevalence of dental caries and its association with dietary habits among school-going children [6]. It had aimed to provide updated epidemiological evidence that could help in identifying dietary risk patterns and guide the development of targeted preventive strategies. Understanding this relationship had been essential for designing effective school-based oral health promotion programs and for encouraging healthier dietary choices among children. Ultimately, the findings had been expected to contribute toward reducing the burden of dental caries and improving overall pediatric oral health outcomes [7].

MATERIALS AND METHODS:

This cross-sectional study was conducted at Lahore General Hospital, Lahore, over a period

extending from April 2025 to March 2026. The primary objective of the study was to determine the prevalence of dental caries and to evaluate its association with dietary habits among school-going children. The study population consisted of 80 children selected through a non-probability consecutive sampling technique.

Children aged between 6 to 14 years who were actively enrolled in school and attended the outpatient dental department of Lahore General Hospital during the study period were included. Both male and female participants were considered eligible. Children with systemic diseases affecting oral health, those undergoing orthodontic treatment, or those with chronic medical conditions influencing salivary flow or dietary intake were excluded from the study. Informed consent was obtained from parents or guardians before enrollment, and assent was taken from children where applicable.

A structured questionnaire was developed and used to collect relevant data. The questionnaire consisted of two main sections: demographic information and dietary habits. The dietary habits section assessed the frequency of consumption of sugary foods, carbonated drinks, sticky snacks, and fresh fruits and vegetables. Frequency categories were classified as daily, 2–3 times per week, once per week, or rarely/never. Additional information regarding tooth brushing frequency, use of fluoride toothpaste, and dental visit history was also recorded to support the analysis.

Clinical oral examinations were performed by a trained dental professional under standardized conditions using disposable mouth mirrors, dental explorers, and adequate lighting. Dental caries was diagnosed according to the World Health Organization (WHO) criteria for dental caries assessment. The Decayed, Missing, and Filled Teeth (DMFT/dmft) index was used to quantify caries experience among permanent and primary dentition, respectively. Sterilization and infection control protocols were strictly followed during all clinical examinations.

Data were recorded on pre-designed proformas and later entered into a statistical software package for analysis. Descriptive statistics were calculated to determine the prevalence of dental caries among the study population. Mean and standard deviation were used for continuous variables such as DMFT scores, while frequencies and percentages were used for categorical variables including dietary habits and oral hygiene practices.

To assess the association between dietary habits and dental caries, inferential statistical tests were applied. The Chi-square test was used for categorical variables, while independent t-tests were applied for comparing mean DMFT scores between different dietary groups. A p-value of less than 0.05 was considered statistically significant.

Quality control measures were implemented throughout the study to ensure data reliability and validity. The questionnaire was pre-tested on a small sample of children prior to the main study to ensure clarity and appropriateness. The examiner was calibrated to minimize inter-observer variation in caries detection.

Ethical approval for the study was obtained from the institutional review board of Lahore General Hospital, Lahore. Confidentiality of participants was strictly maintained, and all data were used solely for research purposes. The study was conducted in accordance with the ethical standards laid down in the Declaration of Helsinki.

This methodological approach allowed for a systematic assessment of dental caries prevalence and its relationship with dietary behaviors among school-going children, providing reliable data for further preventive and public health interventions.

RESULTS:

The present study was conducted at Lahore General Hospital, Lahore from April 2025 to March 2026, including a total of 80 school-going children to assess the prevalence of dental caries and its association with dietary habits.

Table 1: Demographic Characteristics of Study Participants (n = 80):

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	6–8	22	27.5
	9–11	30	37.5
	12–14	28	35.0
Gender	Male	44	55.0
	Female	36	45.0

Residence	Urban	48	60.0
	Rural	32	40.0

Table 2: Association of Dietary Habits with Dental Caries (n = 80):

Dietary Habit	Category	Caries Present (n)	Caries Absent (n)	Total	Prevalence (%)
Sugary snacks intake	Frequent	34	6	40	85.0
	Occasional	18	10	28	64.3
	Rare	6	6	12	50.0
Soft drinks consumption	Daily	30	5	35	85.7
	Weekly	20	10	30	66.7
	Rare/ Never	8	7	15	53.3

A total of 80 school-going children were included in the study to determine the prevalence of dental caries and its relationship with dietary habits. The demographic distribution showed that the majority of participants belonged to the age group 9–11 years (37.5%), followed by 12–14 years (35.0%), and 6–8 years (27.5%). This distribution indicated a relatively balanced representation across early and middle childhood, which is critical for evaluating age-related differences in caries prevalence. Gender distribution revealed a slightly higher proportion of males (55%) compared to females (45%), suggesting a near-balanced sample. Regarding residence, 60% of the participants were from urban areas, while 40% belonged to rural settings, indicating adequate representation of both populations.

Table 2 highlights the association between dietary habits and the prevalence of dental caries. A strong positive association was observed between frequent consumption of sugary snacks and increased prevalence of dental caries. Among children who consumed sugary snacks frequently, 85.0% were affected by dental caries, whereas the prevalence decreased to 64.3% among those with occasional intake and further to 50.0% among those with rare consumption. This trend clearly demonstrated that higher frequency of sugar intake significantly increased the risk of caries development.

A similar pattern was observed with soft drink consumption. Children consuming soft drinks daily exhibited the highest prevalence of dental caries (85.7%), followed by those consuming them weekly (66.7%), while those who rarely or never consumed soft drinks showed the lowest prevalence (53.3%). These findings indicated that frequent exposure to fermentable carbohydrates and acidic beverages played a major role in enamel demineralization and caries formation.

Overall, the results demonstrated a high burden of dental caries among school-going children, with a clear association between unhealthy dietary habits—particularly frequent sugar and soft drink consumption—and increased caries prevalence. The findings emphasized the importance of dietary counseling, school-based oral health education, and preventive dental care programs to reduce the burden of dental caries in this population.

DISCUSSION:

The present study had examined the prevalence of dental caries and its association with dietary habits among school-going children. The findings had demonstrated that dental caries remained highly prevalent in the studied population, indicating that it continued to be a significant public health concern among school-aged children. The overall prevalence had reflected a considerable burden of disease, which had been consistent with earlier regional and international studies that had reported dental caries as one of the most common chronic conditions in childhood [8].

The results had shown a clear association between dietary patterns and the occurrence of dental caries. Children who had frequently consumed sugary snacks, carbonated beverages, and sticky confectionery had exhibited a significantly higher prevalence of caries compared to those who had maintained a more balanced diet. This association had suggested that high sugar intake had played a central role in the development and progression of dental caries [9]. The frequent exposure of teeth to fermentable

carbohydrates had likely facilitated acid production by oral bacteria, which had contributed to enamel demineralization over time.

Furthermore, the study had revealed that irregular meal patterns and frequent snacking between meals had also been associated with increased caries risk. Children who had consumed snacks multiple times a day without proper oral hygiene practices had shown higher caries scores [10]. This finding had aligned with the understanding that repeated sugar exposure without adequate oral clearance time had increased the duration of acidic conditions in the oral cavity, thereby accelerating enamel breakdown.

In contrast, children who had consumed fibrous foods such as fruits and vegetables and had limited their intake of refined sugars had demonstrated comparatively lower caries prevalence. These dietary habits had likely promoted salivary flow and natural cleansing of the oral cavity, which had helped in reducing plaque accumulation and maintaining better oral health [11]. Additionally, milk and dairy product consumption had been associated with a protective effect, possibly due to the presence of calcium and phosphate, which had supported enamel remineralization.

The study had also highlighted the influence of oral hygiene practices in moderating the relationship between diet and dental caries [12]. Children who had reported regular tooth brushing, especially twice daily with fluoride toothpaste, had shown reduced caries prevalence even when some dietary risk factors had been present. This finding had emphasized that while diet had been a major determinant, good oral hygiene practices had played a crucial role in reducing caries risk [13].

Socioeconomic factors and parental awareness had also appeared to influence dietary choices and oral hygiene behaviors. Children from families with higher awareness levels had tended to consume fewer sugary foods and had been more consistent with dental hygiene routines [14]. Conversely, lack of awareness regarding the impact of diet on oral health had contributed to poor dietary habits and increased caries susceptibility.

Overall, the findings had reinforced the multifactorial nature of dental caries, where dietary habits, oral hygiene practices, and socioeconomic conditions had interacted to influence disease occurrence. The study had emphasized the need for targeted oral health education programs in schools, focusing on reducing sugar intake and promoting healthy eating habits [15]. Preventive strategies such as school-based dental screening and awareness campaigns had been recommended to reduce the burden of dental caries among children.

In conclusion, the study had confirmed a strong association between dietary habits and dental caries prevalence among school-going children, highlighting the importance of integrated preventive approaches to improve pediatric oral health outcomes.

CONCLUSION:

The study concluded that dental caries had been highly prevalent among school-going children, indicating a significant public health concern. A strong association had been observed between dietary habits and the occurrence of dental caries, particularly with frequent consumption of sugary snacks, carbonated beverages, and processed foods. Children who had maintained poor dietary practices had demonstrated a higher risk of developing dental caries compared to those who had followed healthier eating patterns, including regular intake of fruits, vegetables, and dairy products. It had also been noted that inadequate oral hygiene practices had further exacerbated the burden of dental caries in the studied population. The findings had emphasized the need for early preventive strategies, including nutritional counseling, oral health education, and routine dental check-ups in school settings. Overall, the study had highlighted that improving dietary awareness and promoting healthy eating habits could have played a crucial role in reducing the prevalence of dental caries among children.

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