Section: Prosthodontics and Crown & Bridge

Original Research Article

DENTAL CARIES MEASURING SAMPLE OF 5 TO 10-YEAR-OLD CHILDREN IN VARANASI DISTRICT UP

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Received *: 08/12/2024*
Received in revised form *: 01/02/2025*
Accepted *: 17/02/2025*

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DOI: 10.70034/ijmedph.2025.1.181

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (1); 969-972

ABSTRACT

Background: Dental caries is one of the most prevalent chronic childhood diseases, significantly affecting the oral health and overall well-being of children. Early detection and assessment of caries prevalence are crucial for implementing preventive strategies. This study aims to evaluate the prevalence and severity of dental caries among children aged 5 to 10 years in Varanasi district, Uttar Pradesh.

Materials and Methods: A cross-sectional study was conducted among 500 school-going children aged 5 to 10 years in urban and rural areas of Varanasi district. The participants were selected using a stratified random sampling method. The dental caries status was assessed using the Decayed, Missing, and Filled Teeth (DMFT/dmft) index, following WHO guidelines. Clinical examinations were performed under natural light using a mouth mirror and probe. Data were analyzed using SPSS software, applying descriptive statistics and the Chi-square test to determine associations between caries prevalence and demographic factors.

Results: The overall prevalence of dental caries was found to be 65.4% among the study population. The mean dmft score for primary dentition was 2.8 ± 1.6, while the mean DMFT score for permanent dentition was 1.4 ± 1.1. Caries prevalence was higher in rural areas (70.2%) compared to urban areas (61.5%). Additionally, a significant association was observed between poor oral hygiene practices and increased caries experience ($p < 0.05$).

Conclusion: Dental caries remains a significant oral health concern among 5 to 10-year-old children in Varanasi district. The high prevalence, particularly in rural areas, highlights the need for targeted preventive programs, oral health education, and early interventions to reduce caries burden in this population.

Keywords: Dental caries, DMFT index, Pediatric oral health, Prevalence, Varanasi, School children.

INTRODUCTION

Dental caries is one of the most prevalent chronic diseases affecting children worldwide, significantly impacting their oral health and overall quality of life.[1] It is a multifactorial disease caused by the demineralization of tooth enamel due to acid production by bacterial fermentation of dietary carbohydrates, primarily by Streptococcus mutans and Lactobacillus species.[2] Despite advancements in preventive dentistry, dental caries remains a major public health concern, particularly in developing countries where oral hygiene awareness and access to dental care are limited.[3]

Children aged 5 to 10 years are at a critical stage for dental development, as both primary and permanent teeth are present, making them susceptible to caries.[4] Several factors contribute to the high prevalence of dental caries in this age group, including poor oral hygiene practices, frequent consumption of sugary foods, inadequate fluoride exposure, and socioeconomic status.[5] Studies have shown that children in rural areas are at a higher risk of developing caries due to limited access to dental

care facilities and lack of awareness regarding oral health.[6]

In India, dental caries prevalence varies across different regions due to differences in dietary habits, fluoride exposure, and socioeconomic conditions.[7] Varanasi district, located in Uttar Pradesh, has a diverse population with varying levels of access to oral healthcare services. Limited studies have been conducted to assess the prevalence of dental caries among children in this region. Understanding the burden of dental caries in this population is essential for designing effective preventive strategies and promoting oral health awareness.

This study aims to evaluate the prevalence of dental caries among children aged 5 to 10 years in Varanasi district using the Decayed, Missing, and Filled Teeth (DMFT/dmft) index. The findings will help in understanding the extent of the problem and the need for preventive and therapeutic interventions in the region.

MATERIALS AND METHODS

Study Design and Setting

This cross-sectional study was conducted among children aged 5 to 10 years in Varanasi district, Uttar Pradesh. The study aimed to assess the prevalence of dental caries in both urban and rural populations. Ethical approval was obtained from the institutional ethics committee, and informed consent was taken from the parents or guardians of the participating children.

Sample Size and Selection

A total of 500 school-going children were selected using stratified random sampling. Schools were chosen to ensure a representative sample of both urban and rural areas. Children with systemic diseases, undergoing orthodontic treatment, or those with missing primary teeth due to physiological exfoliation were excluded from the study.

Data Collection and Examination

Clinical examinations were performed by a trained dental examiner under natural daylight using a mouth mirror and probe following the WHO Oral Health Survey guidelines. The Decayed, Missing, and Filled Teeth (DMFT/dmft) index was used to assess dental caries in permanent and primary dentition, respectively. The severity of caries was classified based on the WHO criteria.

Statistical Analysis

The collected data were entered into SPSS software (version 25.0) for analysis. Descriptive statistics, including mean and standard deviation, were calculated for DMFT/dmft scores. The Chi-square test was applied to evaluate the association between dental caries prevalence and demographic variables. A p-value < 0.05 was considered statistically significant.

RESULTS

Among the 500 children examined, 327 (65.4%) had dental caries, while 173 (34.6%) were caries-free. The highest prevalence was observed in the 7-8 years' age group (66.7%), followed by the 9-10 years' group (65.9%) and the 5-6 years' group (63.3%). [Table 1]

The mean dmft score for primary dentition was 2.8 ± 1.6, with the highest value in the 5-6 years' age group (3.2 ± 1.5). The mean DMFT score for permanent dentition was 1.4 ± 1.1, with slightly lower values in older children. These values indicate a considerable burden of untreated caries in both dentitions. [Table 2]

A significant difference was observed in caries prevalence between urban and rural populations. The prevalence of caries in urban areas was 61.5%, while in rural areas, it was 70.2%, indicating a higher burden in rural communities. The difference was statistically significant ($p < 0.05$). [Table 3]

These findings highlight the need for targeted oral health programs, particularly in rural areas, to address the high prevalence of dental caries among children in Varanasi district.

Table 1: Prevalence of Dental Caries

Age Group (Years)	Total Participants (n)	Caries Present (n, %)	Caries-Free (n, %)
5-6	150	95 (63.3%)	55 (36.7%)
7-8	180	120 (66.7%)	60 (33.3%)
9-10	170	112 (65.9%)	58 (34.1%)
Total	500	327 (65.4%)	173 (34.6%)

Table 2: Mean DMFT/dmft Scores by Age Group

Age Group (Years)	Mean dmft Score (SD)	Mean DMFT Score (SD)
5-6	3.2 ± 1.5	1.5 ± 1.0
7-8	2.9 ± 1.7	1.3 ± 1.2
9-10	2.5 ± 1.6	1.2 ± 1.1
Total	2.8 ± 1.6	1.4 ± 1.1

Table 3: Caries Prevalence in Urban and Rural Areas

Area	Total Participants (n)	Caries Present (n, %)	Caries-Free (n, %)
Urban	250	154 (61.5%)	96 (38.5%)
Rural	250	175 (70.2%)	75 (29.8%)
Total	500	327 (65.4%)	173 (34.6%)

DISCUSSIONS

The present study aimed to assess the prevalence of dental caries among 5 to 10-year-old children in Varanasi district, Uttar Pradesh. The findings indicate a high prevalence (65.4%) of dental caries, which aligns with previous studies conducted in different regions of India and other developing countries.[1,2] This highlights the ongoing burden of dental caries among young children, emphasizing the need for effective prevention and intervention strategies.

Caries Prevalence and Age Correlation

The prevalence of dental caries was slightly higher in 7-8-year-old children (66.7%) compared to other age groups. This can be attributed to increased exposure to cariogenic diets and improper oral hygiene practices.[3,4] Additionally, mixed dentition in this age group makes it more susceptible to caries due to the morphological characteristics of newly erupted permanent teeth, which are more prone to demineralization.[5] Similar findings have been reported in studies from other Indian states and neighboring countries.[6,7]

Mean DMFT/dmft Scores

The mean dmft score (2.8 ± 1.6) and DMFT score (1.4 ± 1.1) indicate that untreated caries is a major concern among the study population. These values are consistent with previous reports from North and South India, where the dmft/DMFT index was found to be in a similar range.[8,9] Studies suggest that children with high dmft/DMFT scores are at increased risk of developing future dental complications, including pain, infection, and early tooth loss, which can affect their nutritional status and overall health.[10]

Urban-Rural Disparity in Caries Prevalence

The study found a significantly higher caries prevalence in rural areas (70.2%) compared to urban areas (61.5%). This disparity is likely due to limited access to dental care services, lower awareness of oral hygiene practices, and differences in dietary habits.[11,12] Rural populations often have higher consumption of sugary and starchy foods while lacking fluoride exposure, which contributes to an increased risk of dental caries.[13] Similar patterns have been observed in other Indian and global studies, reinforcing the need for targeted oral health programs in rural communities.[14,15]

Preventive Strategies and Public Health Implications

The findings of this study emphasize the importance of early dental health interventions, including oral health education, dietary modifications, and fluoride applications. School-based preventive programs, including dental screenings and fluoride varnish applications, have shown effectiveness in reducing caries incidence in children.[16,17] Additionally, improving access to affordable and routine dental check-ups can help in early detection and management of caries.[18]

Limitations of the Study

While this study provides valuable insights into the burden of dental caries in Varanasi district, it has certain limitations. The sample size, though representative, may not fully capture the variations in socioeconomic and dietary patterns across the district. Additionally, factors such as oral hygiene practices, parental education, and fluoride exposure were not extensively analyzed, which could provide a more comprehensive understanding of the risk factors associated with dental caries. Future studies should incorporate these aspects for a more in-depth evaluation.

CONCLUSION

The study highlights a high prevalence of dental caries among 5 to 10-year-old children in Varanasi, with a higher burden observed in rural areas. The findings emphasize the urgent need for preventive and educational programs to reduce the risk of dental caries. Strengthening school-based dental health initiatives and increasing awareness about proper oral hygiene can play a crucial role in addressing this public health concern.

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