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Prevalence and Comparison of Dental Caries Experience Among Government and Private School Children in Abbottabad: A Community Dental Outreach-Based Study

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Abstract

The present study was conducted to assess the prevalence of dental caries and to compare the components of the Decayed, Missing, and Filled Teeth (DMFT) index among school children studying in government and private schools in Abbottabad. Differences according to gender and age groups were also explored using data obtained from community-based dental awareness programs conducted in 2025. A descriptive cross-sectional study was carried out from June to August 2025 as part of school oral-health awareness activities organized by the Department of Community Dentistry, Women Dental College, Abbottabad. Dental examinations were performed using the WHO-recommended DMFT index. Schools were categorized into government and private institutions, and demographic information including age and gender was recorded. Non-probability convenience sampling technique was used, and the collected data were analyzed using IBM SPSS version 24. Descriptive statistics were calculated, while chi-square and independent t-tests were used to examine differences in caries prevalence and mean DMFT components across groups. Results were considered statistically significant when p-value was less than 0.05. A total of 1,615 schoolchildren were included in the final analysis, with a mean age of 15.8 ± 1.9 years. Among these 52.4% were female and 47.6% were male. The prevalence of dental caries (DMFT>0) was observed to be 47.3%. The mean scores for individual DMFT components were 1.19 for decayed teeth, 0.19 for missing teeth, and 0.03 for filled teeth. A higher prevalence of dental caries was observed in private schools (60.9%) as compared to those in government schools which was (36.9%). Female students exhibited greater prevalence as compared to male students. Furthermore, a gradual increase in mean DMFT scores was seen with increasing age among adolescents. Dental Caries remain the most common oral health concern among school children in Abbottabad. the finding suggests a comparatively higher burden among private schools' students and female adolescents. Strengthening school based preventive strategies, including oral health education, routine dental visits and dietary counseling, may help to reduce the burden of dental caries in this population.

Keywords Dental Caries, DMFT index, school children, gender differences, Abbottabad, community dentistry

1. Introduction

Dental caries remains to be one of the most common dental diseases affecting children worldwide and remains a major public health concern. Despite improvements in preventive dentistry, the burden of dental caries among school-aged children remains high, particularly in developing countries where

preventive services and oral-health awareness programs may be limited (1,2). In Pakistan, dental caries is frequently reported among young children, highlighting the need for better preventive strategies and early detection programs (3,4).

In epidemiological research studies, the Decayed, Missing and Filled teeth (DMFT) index is widely used to measure dental caries within populations. The

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DMFT index provides a simple and reliable indicator by recording the number of decayed, missing and restored teeth in an individual (5). The distribution of DMFT components can also deliver important insight into the application of dental services and the level of untreated disease in a community (6).

Schools serve as a platform for assessing oral health and promoting preventive care. Regular school-based dental screenings will help in early identification of dental problems and create useful opportunities for providing oral health education to children at a formative stage of life (7,8). Previous studies have suggested that there exists a difference in caries experience in students attending government and private schools. These differences are often due to socioeconomic status, lifestyle factors and dietary habits (9).

Apart from school type, age and gender are also likely to affect the occurrence of dental caries. Most of the studies have reported slightly higher caries prevalence among female students, which may be explained by earlier eruption of permanent teeth, hormonal influences and variations in oral hygiene practices or dietary behavior (10,11).

Given the limited availability of region-specific data, this study was undertaken to determine the prevalence of dental caries among schoolchildren in Abbottabad and to compare DMFT components between students enrolled in government and private schools. In addition, variations according to age and gender were explored using data collected through community-based dental awareness programs conducted in 2025.

2. Materials and Method

2.1. Study Design and Setting

This descriptive cross-sectional study was conducted by Women Dental College, the Department of Community Dentistry, Abbottabad, from June to August 2025, during dental health awareness programs in different private and government schools.

2.2. Study Population

The study population included school-going children of both private and government schools in Abbottabad city, aged 12-17 years.

2.3. Inclusion and Exclusion criteria

Participants included in this study were those who enrolled in government and private schools of Abbottabad, aged 12-17 years. Those who presented and participated in the study were completely screened at school on the day of the community outreach activity (from June to August 2025), with complete demographic details (school, age, gender) included in the present study. On the other hand, those school children who were absent on the day of the dental camp, or with incomplete demographic information or those who had not completed oral examination were excluded from the study.

2.4. Operational Definitions

- **Dental Caries** is a chronic and most prevalent dental disease, and for this study, caries is defined as one or more decayed, missing (due to caries) and permanently filled teeth as per World Health Organization (WHO) criteria. The tool used to record the caries score is DMFT index. Participants recorded a score greater than zero, which was considered to have dental caries.
- **DMFT Index** is defined as a standardized epidemiological tool used to assess caries experience in permanent dentition. The scores are calculated as the sum of;
 - D (Decayed)= number of decayed teeth
 - M (Missing)= number of missing teeth due to caries
 - F (Filled)= number of permanently filled teeth
 - Total DMFT = D+M+F
- **Prevalence of Dental Caries** is defined as a proportion of caries score in study participants greater than zero (DMFT>0) among the total examined school children.
- **School Type** in this study is categorised as Government and Private schools, which are defined as follows: when the government is responsible for funding and management of an educational institute is called “Government School”, while educational institutions funded and managed by private organizations called “Private School”.
- **Gender** was recorded as “Male” and “Female” as per the given information from the school administration while recording demographic data of the school children.

- **Age** was defined in the present study as a continuous variable and taken as full years at the time of participants' oral screening. Ages included in this study were ≤ 14 years, 15–16 years, and ≥ 17 years.

2.5. Sampling and Data Collection

Non-probability convenient sampling technique was used. Oral examinations were carried out under natural light using sterilized dental mirrors and explorers by calibrated examiners. Dental caries was recorded using the DMFT index according to WHO criteria (12).

Demographic data included age (years) and gender (M = male, F = female). Schools were classified as government [MOU1.1] or private.

2.6. Ethical Considerations

Ethical approval was granted by the Institutional Review Board, Women Dental College, Abbottabad (Approval No. WDC/IRB/2025/792. Permission was obtained from school administration. Data was collected anonymously.

2.7. Statistical Analysis

Data were entered and analyzed using IBM SPSS v24. Descriptive statistics (mean, SD, frequency, percentage) were computed for age, gender, and DMFT components.

Chi-square test compared caries prevalence across gender and school type. Independent t-test compared mean D, M, and F values. A $p < 0.05$ was considered statistically significant.

3. Results

Table 1: Demographic Characteristics of the Study Participants

Demographic Characteristic	Value
Total Students	1,615
Female	847 (52.4%)
Male	768 (47.6%)
Mean Age (years)	15.8 ± 1.9
Age Range (years)	12–17

Table 2: Overall Caries Experience

Oral Health Characteristic	Value
Overall Caries Prevalence	47.3%
Mean Decayed Teeth (D)	1.19

Mean Missing Teeth (M)	0.19
Mean Filled Teeth (F)	0.03

Table 3: Comparison by school type

School Type	Mean D	Mean M	Mean F	Caries Prevalence (%)
Government	1.06	0.13	0.04	36.9
Private	1.36	0.27	0.02	60.9

$p < 0.05$ for difference in caries prevalence.

Table 4: Comparison by gender

Gender	Mean D	Mean M	Mean F	Caries Prevalence (%)
Male	1.10	0.16	0.03	43.6
Female	1.27	0.22	0.02	50.8

Females showed higher decayed and missing means and higher caries prevalence ($p < 0.05$).

Table 5: Caries by age

Age	Caries Prevalence (%)
≤ 14 years	45.1
15–16 years	48.2
≥ 17 years	50.6

The difference was not statistically significant.

4. Discussion

The present study examined dental caries experience among school children in Abbottabad and found that almost half of the participants had evidence of dental caries. This finding is consistent with previous reports from different regions of Pakistan, including Quetta, Islamabad, and Peshawar, where a considerable proportion of school-aged children were also affected by dental caries (1–4). The predominance of the decayed component in the DMFT index observed in this study indicates that a large proportion of carious lesions remain untreated.

A key finding of the present study was the higher prevalence of dental caries among students going to private schools compared with those in government institutions. Similar trends have been reported in previous studies from Pakistan (7,9,10). This difference may be explained by several contributing

factors. Students in private schools are more likely to have access to commercially available snacks, sugary foods and sweetened beverages, all of which are established risk factors for the development of dental caries (11-13). The increased availability of these items, combined with lifestyle patterns often associated with urban schooling, may partially contribute to the higher caries in this group.

The students attending government schools come from families with comparatively lower socioeconomic backgrounds. While access to dental care may be limited in these populations, their dietary habits may include fewer processed foods and sugary beverages thereby reducing exposure to cariogenic factors (14,15). Such differences in lifestyle and food choices may help to explain the comparatively lower prevalence of dental caries observed among government students.

The findings also indicated a slightly higher prevalence of dental caries among female students. Comparable gender-based differences have been reported in both regional and international studies (16-19). This difference may be due to a combination of behavioral and biological factors. Such as, earlier eruption of permanent teeth in females may increase the duration of exposure to cariogenic conditions within the oral cavity (17). In addition, hormonal changes together with differences in dietary habits and snacking behavior, may also contribute to a higher risk of dental caries among adolescent girls (20,21).

Another important observation of this study was the very low contribution of the filled component of the DMFT index. This suggests that restorative dental care treatment is rarely used within the study population. In many cases, the affected teeth may ultimately be extracted rather than restored if the carious lesions remain untreated. Limited access to dental services, financial barriers, and low awareness of available restorative treatment options are likely to contribute to low DMFT index (22,23).

Evidence from previous research suggests that preventive strategies delivered in school settings can help to reduce the burden of dental caries among children. Intervention measures such as fluoride varnish application, fissure sealants, oral health education, and regular dental screening have been linked with improved oral health outcomes in school-aged populations (22-25). Incorporating these

preventive approaches into regular school health programs could therefore help to lower the prevalence of dental caries among children in Abbottabad.

5. Limitations

This study offers important understanding of dental caries burden among school children in Abbottabad, but certain limitations should be considered. The generalizability of the findings to other regions of Pakistan may be restricted as it was confined to a single district. The sampling approach may therefore not fully represent all schoolchildren in the area as data collection was carried out through community-based dental outreach programs. Furthermore, important variables such as socioeconomic status, dietary patterns, oral hygiene practices, and parental education were not assessed in detail. These factors may influence the incidence of dental caries and need further studies in future research. In spite of these limitations, the relatively large sample size and the use of standardized WHO diagnostic criteria improve the overall reliability of the findings.

6. Conclusion

The findings of this study suggest that dental caries remains an important oral health concern among schoolchildren in Abbottabad. Almost half of the students assessed were affected, with higher prevalence observed among private school and female school children. These findings highlight the need to strengthen preventive oral health initiatives within school settings. Interventions such as regular dental screening, oral health education, and fluoride-based preventive measures may help improve the oral health status of students in both government and private school settings.

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