

# The Prevalence of Dental Caries among 12 to 15-year-old School Children in Nigeria: Report of a Local Survey and Campaign

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**Purpose:** To assess the prevalence of dental caries among school children in Egor local government area (district) and establish baseline data.

**Design:** Cross-sectional survey of urban and rural, private and public school children in Egor district, Edo State, Nigeria.

**Materials and Methods:** A total of 358 randomly selected school children aged 12 to 15 years from urban and rural, private and public schools in Egor District were examined for dental caries according to the World Health Organization (WHO) criteria. A questionnaire was administered to elicit information from the participants on tooth cleaning, dietary habits and dental experience. An oral health campaign was conducted in the selected schools as an incentive. Data were analyzed using SPSS 7.5.

**Results:** Sixty-seven percent ( $n = 238$ ) of the school children were caries-free. Mean DMFT score was 0.65 ( $sd = 1.14$ ). Decayed teeth accounted for the largest component (98.6%). No fillings were recorded. Prevalence (mean DMFT) was higher in females (0.70) than males (0.59); urban (0.72) more than rural (0.53); private schools (0.75) more than public schools (0.55). DMFT scores at age 12, 13, 14 and 15 were 0.51, 0.63, 0.78 and 0.66 respectively; 81.4% of the school children had never visited a dental clinic, 95.8% claimed to use a toothbrush and 87.5% regularly consumed snacks.

**Conclusion:** The prevalence of caries in Egor District is very low. Untreated caries indicates that preventive and restorative treatment needs are high. Dental and dietary habits are likely to increase this prevalence; hence the need for continuous monitoring, preventive and restorative programmes.

**Key words:** dental caries, schoolchildren, dietary habits, tooth cleaning, Nigeria

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Dental caries is a threatening oral health problem in developing countries including Nigeria, Africa's most populous country, with 36 states and

774 districts, where it is becoming a public health concern (Simoyan, 1999). This observation is generally attributed to a change in dietary habits from traditional to a Western-style diet as a result of increased availability and consumption of refined carbohydrates (Enwonwu, 1981; Adegbembo et al, 1995). In the literature, African high socio-economic status children and those residing in urban areas have been found to have a higher prevalence of caries (Adegbembo et al, 1995; El-Nadeef et al, 1998; Alonge and Navendan, 1999; Normark, 1993), while in industrialized countries with effec-

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tive fluoridation programmes and modifications of cariogenic diet, a lower prevalence of caries is being reported in children of higher socioeconomic status (Slade et al, 1996). The lack of dental awareness and services are also among significant factors influencing the prevalence of caries particularly in developing countries (Irigoyen et al, 1999). Because of its large size (population of approx. 130 million) and cultural diversity, caries distribution studies in Nigeria need to be adequately and regularly undertaken at district level to elicit both the true national pattern and trends for proper oral health planning. The purpose of the present study was to assess the caries experience of 12 to 15-year-old school children in Egor district, Edo State, in order to establish baseline data for future reference. An oral health campaign component, which focused on the causes, consequences and prevention of dental caries, periodontal diseases and halitosis, was incorporated in the study as an incentive to the participating schools.

## MATERIALS AND METHODS

In this study, conducted between November and December 2002, eight co-educational secondary schools in Egor District were selected by a process of stratified random sampling from a list obtained from Ministry of Education.

The sampling technique took into account school children from private and public schools, rural and urban areas. According to a categorization established by the Ministry of Education, private schools are those owned and run by individual proprietors or non-governmental organizations, and these are usually better equipped, expensive and efficiently administered compared to government financed public schools. Thus, high socio-economic status parents prefer private schools. For the purpose of this study urban schools are schools (private or public) located within the relatively highly populated and busy metropolitan area of Benin City, the state capital, where there is limited access to piped water. The rural area refers to schools on the outskirts of, or adjoining villages, which are less densely populated with no piped water, where the population relies on streams and wells for drinking water. None of the areas enjoy any form of artificial water fluoridation.

Consent for the study was obtained from each school principal. A sample size requirement of 323

was calculated based on an estimated 30% prevalence of caries (Kubota et al, 1984), an absolute sampling error of 5%, and confidence interval in proportion of 95%. The final sample consisted of 358 school children selected by stratified and systematic random sampling.

Dental examination and dental caries assessment was carried out under natural light, with mirror and probe according to the WHO diagnostic criteria (WHO, 1987) using the DMFT index, and the data recorded in a chart adapted from the WHO form and incorporated in the questionnaire designed to elicit information on tooth cleaning methods, snacking habits and previous dental visits. Intraexaminer reliability was assessed by a repeat DMFT examination of 15 students selected by the school nurse during the pre-test at the University Demonstration Secondary School. The investigator previously trained on caries assessment at the Inter Country Center for Oral Health for Africa (ICOH). He was assisted by a non-examining dental intern during the fieldwork, and supervised by a Community Health Physician/Epidemiologist. Oral health education was given to the children highlighting the causes, consequences and prevention of common oral diseases. Collated data were analyzed at the Computer Center, University of Benin with the SPSS statistical software program 7.5, (SPSS inc., Chicago IL, USA).

## RESULTS

Approximately 67% (n = 238) of the school children were caries-free (Table 3). The total mean DMFT of the sample was 0.65 (standard deviation = 1.14).

The prevalence of caries was higher in females with DMFT 0.70 than males 0.59. The mean DMFT scores at age 12, 13, 14, and 15 were 0.51, 0.63, 0.78 and 0.66 respectively. Decayed teeth accounted for the largest component of DMFT (98.6%). No filled or missing teeth on account of caries were seen. Children in schools located in urban areas had higher DMFT values 0.72 than their rural counterpart 0.53. Private and public schools had 0.75 and 0.55 DMFT scores respectively – higher in private schools. For all ages except age 15, urban children had higher DMFT values (Table 2).

Female school children had higher scores than males. The differences in the prevalence of caries were not statistically significant (Table 3). The tooth cleaning methods of schoolchildren is shown in

**Table 1** Frequency distribution of decayed, missing and filled teeth (DMFT) in Egor school children

| DMFT  | Frequency | %     |
|-------|-----------|-------|
| 00    | 238       | 66.5  |
| 1.00  | 55        | 15.4  |
| 2.00  | 38        | 10.6  |
| 3.00  | 14        | 3.9   |
| 4.00  | 9         | 2.5   |
| 5.00  | 3         | .8    |
| 8.00  | 1         | .3    |
| Total | 358       | 100.0 |

**Table 2** Mean DMFT core according to location and age (Standard deviation in parentheses)

|    | Urban       |        | Rural       |        |
|----|-------------|--------|-------------|--------|
|    | Mean DMFT   | Number | Meant DMFT  | Number |
| 12 | 0.58 (0.92) | 53     | 0.38 (0.74) | 34     |
| 13 | 0.72 (1.05) | 39     | 0.50 (0.72) | 24     |
| 14 | 0.96 (1.58) | 53     | 0.44 (0.80) | 27     |
| 15 | 0.65 (1.25) | 80     | 0.69 (1.20) | 48     |

**Table 3** Mean DMFT according to school location and sex of school children

| LOCATION<br>Sex                   | Urban |      |     | Rural |      |    |
|-----------------------------------|-------|------|-----|-------|------|----|
|                                   | DMFT  | SD   | N   | DMFT  | SD   | N  |
| Male                              | 0.66  | 1.25 | 106 | 0.48  | 0.85 | 66 |
| Female                            | 0.77  | 1.23 | 119 | 0.56  | 1.04 | 65 |
| F (1,354) = 2.37, p = 0.13 > 0.05 |       |      |     |       |      |    |

**Table 4** Tooth cleaning method by location (residence) of schoolchildren

|               | Urban | Rural | Total | %     |
|---------------|-------|-------|-------|-------|
| Toothbrush    | 214   | 125   | 339   | 95.8  |
| Chewing stick | 3     | 4     | 7     | 2.0   |
| Combination   | 3     | 3     | 6     | 1.7   |
| Others        | 2     | –     | 2     | 0.6   |
| Total         | 222   | 132   | 354   | 100.0 |

Table 4. Rural children accounted for 53% and urban 47% of those using a chewing stick. More females (71%) used a chewing stick than males (29%).

Three hundred and nine children (87.5%) reported eating cakes, sweets, chocolates and similar snacks (Table 5), with 80% eating such snacks anytime, and 15% between meals. Snacking was higher among urban children (65%). Only 18.6% had previously visited a dental clinic, of which 56% were females and 72% urban residents.

Frequency distribution of schools by location and type are shown in Table 6 and Table 7 respectively. At pre-test the same DMF scores were recorded in fourteen out of the fifteen students and this was interpreted as good intraexaminer agreement.

## DISCUSSION

The main objective of this baseline study was to determine the prevalence of caries and oral health habits of the index-age schoolchildren as a guide for planning school dental health component for pri-

**Table 5** Snacking habit of school children by school location (24 hour recall)

|             | Urban | Rural | Total | %     |
|-------------|-------|-------|-------|-------|
| Snacking    | 200   | 109   | 309   | 87.5  |
| No snacking | 23    | 21    | 44    | 12.5  |
| Total       | 223   | 130   | 353   | 100.0 |

mary oral health care. In line with previously described guidelines (Jeboda and Ericksen, 1998) this process must be preceded by epidemiological surveys at a district level. In this study, an oral health education component was introduced to maximize the benefit of the visit to the schools, because such visits are not routinely carried out in Nigeria (Ogunbodede and Sheiham, 1992). The total mean DMFT of 0.65 and mean DMFT of 0.51 at age 12, comparing with the global indicator for caries

**Table 6 Frequency distribution of school children according to location**

|            | SCHOOL LOCATION |       | TOTAL |
|------------|-----------------|-------|-------|
|            | Rural           | Urban |       |
| Egor       | 41              |       | 41    |
| Use        | 37              |       | 37    |
| Udss       |                 | 54    | 54    |
| Urelu      |                 | 56    | 56    |
| Eweka      |                 | 46    | 46    |
| Hopewell   | 31              |       | 31    |
| Golden     |                 | 69    | 69    |
| St. Thomas | 24              |       | 24    |
| TOTAL      | 133             | 225   | 358   |

**Table 7 Frequency distribution of school children according to school type**

|            | TYPE OF SCHOOL |        | TOTAL |
|------------|----------------|--------|-------|
|            | Private        | Public |       |
| Egor       |                | 41     | 41    |
| Use        |                | 37     | 37    |
| Udss       | 54             |        | 54    |
| Urelu      |                | 57     | 56    |
| Eweka      |                | 46     | 46    |
| Hopewell   | 31             |        | 31    |
| Golden     | 69             |        | 69    |
| St. Thomas | 24             |        | 24    |
| TOTAL      | 177            | 181    | 358   |

monitoring, are very low on the WHO severity scale. This severity level is consistent with earlier Nigerian national surveys (Kubota et al, 1990; Adegbenbo et al, 1995) and some other developing countries (Addo-Yobo et al, 1991; Chironja and Manji, 1989).

No significant differences were observed in DMFT values between the ages, sex, location and type of school probably because the district under investigation is considered to be rather rural and homogeneous. The claimed 95.8% usage of a toothbrush is very high in comparison to 38% in a Ghanaian study (Addo-Yobo et al, 1991). Although the knowledge of toothbrushing techniques and its effectiveness on oral health was not investigated, this claim did not seem to be consistent with the informal observation of a generally poor oral hygiene among the school children. The fact that 18.6% of the school children had previously visited a dental clinic is low. Egor District has one dental school of the four schools in Nigeria; the other three being located in the southwest of the country. The majority of dentists in Nigeria are concentrated in these schools. The study finding that 1.7% of the school children used a chewing stick is of note; although this percentage is much lower than observed in Ghana, it demonstrates the relevance of the pencil-sized chewing stick or tooth cleaning stick as a community oral health aid in West Africa (Sote, 1994).

In the current study more females were observed to have better oral hygiene habits but poorer dietary habits with regard to factors important for caries development; and this has implications for oral health education and promotion (Nzioka et al, 1993; Laiho et al, 1993). However, the higher level of dental visit/experience among females is a positive finding indicating their desire to seek treatment. Furthermore, urbanization tends to favor better oral health habits and service utilization but this leads to increased snacking as previously reported (Al-shammery, 1998; Honkala et al, 1997). The increasing rate of snacking, especially in rural areas, where dental facilities are lacking and traditional means of oral care are preferred has important implications for trends in caries. It is recommended that continuous monitoring, design and implementation of preventive and restorative programmes be carried out in schools.

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