

A Study of dental caries prevalence in 12–14 year old school children in Ibadan, Nigeria

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Abstract The aim of the study was to determine dental caries prevalence among a representative sample of 12–14 year old school children in Ibadan, Nigeria with a view of determining Restorative Index and Met Need Index of the studied population. Dental caries was diagnosed according to the WHO method. Out of the 577 children in the age group, 65 children (11.2%) had dental caries experience as expressed with the DMFT index. More than 85% of the children were caries free. A mode of one DMFT was the highest score for the children although a 14-year-old pupil had DMFT score of 6. Female children had higher mean DMFT score of 2.03 ± 1.13 compared with 1.78 ± 1.0 for males ($P > 0.05$). The Restorative Index (RI) and Met Need Index (MNI) for the children were very low as only the 14-year-old children had an RI of 3.45% and MNI of 0.11. Restorative Index reflects the restorative care of those who have suffered the disease and it is measured as a ratio of filled to filled plus decayed teeth percent that is $F/F + D$ percent. Met Need Index is an indication of treatment received by an individual and it is measured by the ratio of the mean missing plus filled teeth to mean decayed, missing and filled teeth that is $M + F/DMF$. Since cost of management, which may be out of the reach of these children, has been identified as one of the factors militating against their receiving treatment, the result of this study suggest that oral health education with emphasis on correcting snacking habits of school children is desirable.

Key words

Dental caries,
Nigerian children,
Young adolescents

Introduction

Dental caries is one of the most common diseases in the world and it continues to be a common health problem among children. Its prevalence among population and its extent in individuals varies however among nations and over time¹.

Reports on tooth mortality among Nigerians indicated that the major cause of tooth loss in children was dental caries and its sequelae^{2–4}.

Interestingly, the prevalence of dental caries has been on the decline in developed countries and this has been attributed to increased use of fluoride in its various forms⁵, while many developing African

countries have reported an increased prevalence which has been closely linked to changing life styles which includes diet rich in sugars⁶.

High caries prevalence among adolescents has been reported^{7,8}, although recent trends have shown them to benefit from the dramatic progress in the reduction of the prevalence of dental caries in most developed countries⁹, but there is paucity of information on caries prevalence among young Nigerian adolescents. Adolescence marks a time in which the role of the parents in the child's dental home care needs to be minimized and the responsibility of the adolescent for managing his or her own oral health program must be emphasized.

The purpose of this study was to document caries prevalence among a representative sample of 12–14 year old school children in Ibadan, Nigeria

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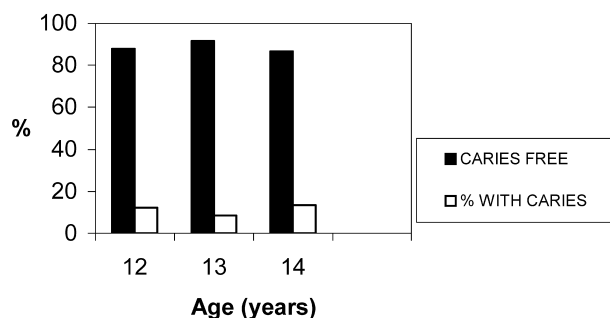


Fig. 1 Dental caries prevalence in 12–14 year old school children

with a view of determining Restorative Index and the Met Need Index of the studied population.

Subjects and Methods

Subjects' selection

Ibadan is a town in the South Western part of Ibadan and it is the largest city in Nigeria with a population of about two million¹⁰.

The children for the study were taken from the state government secondary schools in the five local government areas in Ibadan metropolis. The list of all the secondary schools in the local government areas was supplied by the state Ministry of Education, and 11 schools were chosen using a proportionate sampling method.

Consent to examine the children was obtained from the state Ministry of Education and the principals of each school and only children who consented to their being examined were included in the study. A total of 2,293 school children were examined between October 2003 and March 2004, out of which 577 were in the 12–14 years age group.

Intra-oral examination

At the respective schools, intra-oral examinations were done under natural lightening condition outdoors. Assessment of Dental Status was identified according to the WHO standard method and criteria¹¹) by one of the investigators (OOD). Caries experience was expressed as the number of decayed, missing (due to caries) and filled teeth (DMFT), excluding the 3rd molars.

Tests of statistical analysis were done using the student *t*-test and chi-square test as appropriate with the SPSS version 11.0. Differences were considered statistically significant at the level of $P < 0.05$.

Table 1 Age and gender distribution of children with dental caries

| Age | Male No (%) | Female No (%) | Total No (%) |
|-------|-------------|---------------|--------------|
| 12 | 7 (21.9) | 10 (30.3) | 17 (26.2) |
| 13 | 9 (28.1) | 9 (27.3) | 18 (27.7) |
| 14 | 16 (50.0) | 14 (42.4) | 30 (46.2) |
| Total | 32 (100.0) | 33 (100.0) | 65 (100.0) |

$$\chi^2 = 2.81, P > 0.05. NS$$

Table 2 Frequency distribution of DMFT values among the 12–14 year old school children

| DMFT | 12 yrs | 13 yrs | 14 yrs |
|-------|--------|--------|--------|
| 0 | 123 | 195 | 191 |
| 1 | 7 | 9 | 11 |
| 2 | 6 | 8 | 10 |
| 3 | 2 | 1 | 5 |
| 4 | 2 | 0 | 5 |
| 5 | 0 | 0 | 1 |
| 6 | 0 | 0 | 1 |
| Total | 140 | 213 | 224 |

Results

Prevalence

A total of 577 school children aged 12–14 years were examined. The mean age was 13.2 ± 0.83 years. Sixty-five children (11.2%) had dental caries experience as expressed with the DMFT index. From Figure 1, over 85% of the children in each age group were caries free. Caries prevalence among the three age groups is also shown in Figure 1. Table 1 shows age and gender distribution of children with dental caries. Overall there was almost equal gender distribution.

Frequency distribution

The values of DMFT are presented for each year of the children's age in Table 2. A large number of the children had DMFT of zero and the mode of one DMFT was recorded at the three age groups. Only two children at age 12 years had DMFT of 4, which was the highest for the age group 12 years. At age 14 years, one child each had DMFT of 5, 6 respectively.

Table 3 Gender distributions of DMFT values

| | n | D | M | F | DMFT | Mean |
|--------|----|----|---|---|------|-------------|
| Male | 32 | 55 | 1 | 1 | 57 | 1.78 ± 1.0 |
| Female | 33 | 61 | 5 | 1 | 67 | 2.03 ± 1.13 |

t-test = 0.94, *P* > 0.05

Table 4 Mean DMFT, RI and MNI at the three age groups

| Age | n | D | M | F | DMFT | Mean DMFT | RI | MNI |
|-------|----|-----|---|---|------|------------|------|------|
| 12 | 17 | 33 | — | — | 33 | 1.94 ± 1.0 | — | — |
| 13 | 18 | 27 | 1 | — | 28 | 1.56 ± 0.6 | — | 0.04 |
| 14 | 30 | 56 | 5 | 2 | 63 | 2.10 ± 1.2 | 3.45 | 0.11 |
| Total | 65 | 116 | 6 | 2 | 124 | 1.90 ± 1.0 | 1.70 | 0.07 |

RI: Restorative Index, MNI: Met Need Index

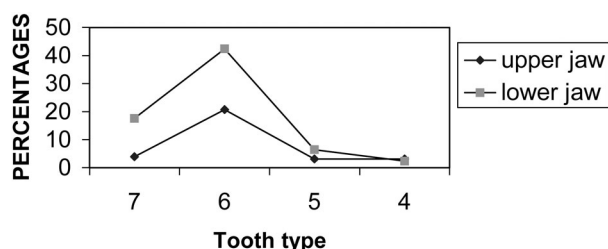


Fig. 2 Jaw distribution of carious teeth
 7: second molars 5: second premolars
 6: first molar 4: first premolars

Mean DMFT values

Female children had significantly higher mean DMFT of 2.03 ± 1.13 compared with 1.78 ± 1.0 for males. Only one boy and one girl each had filling done (Table 3), While from Table 4, the mean DMFT for the 12, 13 and 14 year old children were 1.94 ± 1.0, 1.56 ± 0.6 and 2.10 ± 1.2. Overall, DMFT for all the 65 children was 1.90 ± 1.0.

Met Need Index (MNI) and Restorative Index (RI)

From Table 4, none of the group of 12 year olds had any form of treatment either in form of an extraction or a filling. Therefore the MNI and RI were zero while for the group of 13 year olds, RI was zero and the MNI was 0.04 as one child had an extraction done before.

For the group of 14 year olds RI of 3.45% was found while MNI was 0.11 as five of the children had extractions done previously while two children had amalgam fillings.

Caries distribution on tooth types

The percentages of each attacked tooth relative to the total DMFT for the children is represented in Figure 2. None of the anterior teeth was affected and the first molars were mostly affected.

Discussions

Dental health and caries prevalence have changed tremendously in the last decade. Caries experience in the 12–14 year old children who reside in the western region of Nigeria in the present study was lower than findings in a previous study in which the DMFT at age 12, 13 and 14 years were 2.38, 4.43 and 3.19 respectively for the North Central geographical zone while for the South-South geographical zone, DMFT of 2.00, 1.75 and 1.45 were reported for the same age group¹²⁾. The difference in prevalence in the different parts of the country may be attributed to the rate of sugar consumption among the children and also to the level of awareness in terms of preventive measures among the studied population. Currently, dental caries appears to be less severe in most African countries as compared to several American and European countries⁶⁾. The finding in the present study may be conservative as

only visual criteria were used for caries detection and no radiographs were taken. Adolescents may stray away from the diet that was maintained in their homes and adopt a regime containing much more sugar. Therefore the diagnosis of caries may have underestimated true need as the traditional pattern of very low caries has been broken from a previous study in the Nigeria¹³.

Values of DMFT have been known to increase with increasing age¹⁴. The increase might be attributed to the effects of time on the increased number of teeth susceptible to decay such as the second permanent molars, which erupt during adolescent periods. This pattern of increase DMFT with increase age was not observed among the age group under the present study as the children in the 13 years age group had the lowest DMFT/child. The higher mean DMFT value in female children compared with that of male children is in accordance with most previous studies on caries^{7,13,15}.

Although only 11.2% of all the children within the age group under study had dental caries and more than 85% of children in each age group were caries free, this finding is inconclusive as there is dearth of information to show whether caries prevalence in this part of the country is on the decline or it is increasing. Clinic based studies have reported dental caries and its sequelae as the major cause of tooth loss in children in this environment²⁻⁴. In comparison, various investigations and surveys conducted in different parts of India have reported a decline in the prevalence of dental caries among Indian children at 12 years of age and a DMFT of 0.78 and 0.60 had been reported in two different areas of the country¹⁶.

Earlier report showed that refined carbohydrates consumption in Nigeria was very low because of their cost, with the sugar consumption at 1.65 kg per capita per annum¹⁵ but recently sugar consumption has been put at 6.8 kg per capita per annum¹⁷. Also recent observations have shown that many Nigerian children spend their lunch money on increasing available cheap sugar containing products readily available in and around school premises. Therefore cost is not a debarring factor to the consumption of these products. It may therefore be inferred that caries prevalence has increased over the years although at a slower rate when compared with developed industrialized countries where the per capita per annum of sugar is higher.

Met Need Index (MNI) and Restorative Index

(RI) of the studied children were very low. MNI is an indication of treatments received by an individual. It is measured by the ratio of the mean missing (M) plus filled (F) teeth to mean decayed, missing and filled teeth (DMF) that is $M + F / DMF$. While RI reflects the restorative care of those who have suffered the disease. It is measured by the ratio of filled teeth (F) to filled plus decayed teeth (F + D) percent that is $F / F + D$ percent¹⁸. These results are of interest in studying the provision of dental services to this age group. It therefore means that many of the children with dental caries are without restorative care. This finding is contrary to the findings in London by Pitts and Evans¹⁹ who recorded a 59% Restorative Index for 14-year-old children in 1994/1995 even though this was still considered as been low. Untreated tooth decay may be associated with the avoidance of care which is a careless attitude of most young adolescents, the problem may also be attributable to the low dentist/population ratio in Nigeria, The socio-economic situation whereby majority of the children have limited access to dental services or the high cost of dental treatment may also contribute to the low MNI and more importantly the Restorative Index.

In conclusion, dental health services should focus primarily on the prevention of dental caries since the cost of management may be out of the reach of many who may be affected in many developing countries like Nigeria.

The role of primary health care workers should not be underestimated as they can perform primary prevention programs among school children in the form of oral health education with emphasis on snacking habits of school children. Use of fluorides especially in toothpastes has been documented with much benefit in caries prevention^{20,21} and therefore its use in caries prevention should be emphasized to these children.

Acknowledgments

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