Dental caries in 12-year-old suburban Nigerian school children

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Abstract

Background: Dental caries is one of the commonest oral diseases in children. Despite this fact, not much attention has been given to studies on this issue among suburban Nigerian children.

Objective: To investigate the prevalence of dental caries, dental attendance and oral health behaviours among the 12-year-old suburban Nigerian children.

Subjects and Methods: Four hundred and two schoolchildren (349 boys, 153 girls) from both private and public schools aged 12-year-old participated in the study in 2003. One examiner was calibrated and performed the screening procedures using standard method of WHO diagnostic criteria.

Results: The prevalence of caries was 13.9% and mean DMFT was 0.14. The decayed component accounted for 77.2% of the DMFT while filling and missing teeth accounted for 15.8% and 7% respectively. Over 85% of the children examined were caries free. Seventy seven per cent of the teeth affected by caries were untreated. The probability of having caries experience DMFT > 0 was significantly associated with the type of school and regular sweet consumption p<0.05. The children who had not visited the dentist had higher caries prevalence than other children. This was statistically significant p<0.05. Dental attendance was generally poor in both public (90.6%) and private (83.1%) school children.

Conclusion: The findings in this study for the caries prevalence in 12 year-old suburban Nigerian schoolchildren was as low as in developed countries of central Europe and lower than the global standard according to WHO references for the year 2000.

Key words: Caries, Prevalence, Dental, Attendance, Behaviour, Suburban, Children, Survey, Nigeria.

Introduction

The burden of suffering of dental caries is a common phenomenon and it cuts across all socio-economic strata. Dental caries is a common oral disease in children. Pain and dentoalveolar abscess are the severe complications that may arise from untreated dental caries. Experiencing such complications is a lot of burden on children.

Caries has been defined in many ways in the literature. Modern evidence reveals that there is a continuum of disease states ranging from sub-clinical subsurface changes to more advanced, clinical detectable subsurface caries (with so called “intact” surface layers) to various stages of more advance lesions with microscopic and later macroscopic cavitation of enamel and significant involvement of dentine1,2.

During the past 20 years, understanding of biopathology of dental caries has undergone major refinement. It has been appreciated that dental caries is a phenomenon directly linked to continually present, highly complex molecular process active at the interface of susceptible tooth surfaces area and the microbial biofilms that cover them. In the multiple sites of teeth where such micro-systems exist at various stages a key feature is the constant oscillation between hard tissue demineralization and remineralization1,2.

Although great international and regional differences exist, the incidence and the prevalence of coronal dental caries have declined in the industrialized countries over the past 20 – 25 years4,7. The decline in
dental caries in children in established market economies (EMEs) is well documented. The EMEs include most countries of North America, Western Europe, Canada, Australia, New Zealand and Japan. By the end of the 20th century caries prevalence and incidence among 12-year-old in these regions had declined dramatically. Similar changes have been reported in other parts of the world. Increase in caries level has been reported in 12-year-old children in Croatia. The authors suggested that the war was the likely factor in this change since earlier studies had shown a distinct decline in caries level up to 1991.

Studies of caries in two UNICEF defined regions: Sub-Saharan African region and Middle Eastern crescent (including North Africa) were systematically reviewed by Cleaton – Jones. He reported no overall change in caries levels in 10 countries from each of the two regions between 1988 and 1998. The mean DMFT score trend was relatively constant in the 11 to 13 year old group.

In a recent study, investigating the association between educational indicators and dental caries experience of 12-year-old children in developing countries revealed that dental caries experience of 12-year-old children appears to be highest in countries with low-level of primary education. The authors suggested that the percent of children completing primary education might be considered a good predictor of DMFT–12 indexes in developing countries.

A review of the literature has shown that studies on caries in 12-year-olds have been reported in African children. In Nigeria, the information on studies of caries in 12-year-old children is sparse especially in suburban and rural children. The purpose of this study was to investigate the caries prevalence, dental attendance and oral health behaviours in 12-year-old suburban schoolchildren in Ile–Ife, a suburban population in the south western part of Nigeria.

Material and Methods:
The study was carried out in Ile –Ife, the headquarter of Ile Central local government located in the south western part of Nigeria in 2003. Twelve year – old Nigerian schoolchildren attending secondary school in six selected schools were included in the study. Private and public schools were chosen by the principle of representative sample regarding social, economical and cultural communities in order to attain a realistic view of the condition of the oral health of the target group in the whole of Ile –Ife.

Secondary schools in Ile –Ife are divided into three geographical areas. Three out of the 9 private schools and 3 out of 16 public schools were randomly selected with probability proportional to the total number of schools. All schools involved provided complete list of children in classrooms. All the 402 (349 boys, 153 girls) 12 year – old children who were present in the schools on the day of examination constituted the sample size for the present study.

Prior to the start of the study, the children, their parents and the class teachers were informed. Informed consent was obtained from the parents of the selected 12-year-old children in the schools. Only children whose parent gave their consent were included in the study. None of the children refused to participate. Also, the calibration of the examiners was undertaken by means of a pilot study of 50 children during a one-week period. The method of examination and scoring was standardized in the paedodontic clinic, Faculty of Dentistry, Obafemi Awolowo University, Ile–Ife, until inter and intra- examiner reliability of 85 per cent was archived.

Before the dental examination, a questionnaire comprising information on the frequency of tooth brushing, sweet consumption per day and dental visit behaviour was issued to the children and completed by them under the supervision of dental surgery assistant in order to prevent bias.

Data were collected in the classrooms by means of clinical examination and questionnaires. One calibrated researcher, assisted by a recorder examined all the 402 children under artificial light using plane mouth mirrors. Neither radiographic examination nor drying of teeth was carried out. Dental health status was carried out using DMFT index, following WHO criteria for epidemiological studies. A tooth was classified carious when there was either a cavity, undermined enamel or a softened floor or wall on either the pit or fissure or on one of the smooth surface. The names of children who needed dental treatment were given to the class teacher who informed the parents. All children who needed dental treatment were referred to the Dental Hospital, Obafemi Awolowo University, Ile–Ife for treatment. Oral health education and correct tooth brushing technique was given to all the children examined.

Processing and analysis of data were carried out by means of the statistical package for the social sciences (SPSS – PC version 10.0, computer software ) Chi – Square tests were used for the comparison of proportions. The level of significance was set at 5%.

RESULTS
All the 12-year-old schoolchildren (402) consisting of 349 boys and 153 girls from the six schools were
examined. The dental status of the children according to the type of school they attend is shown in Table 1. The prevalence of caries was 13.9% and the mean DMFT was 0.14. The mean DMFT was low in both public (0.08) and private (0.18) schools. The decayed component (D) of the DMFT accounted for 77.2% while filling (F), missing teeth (M) accounted for 15.8% and 7% respectively. The probability of having caries experience DMFT > 0 was significantly associated with the type of school P < 0.05.

Table 1: Percentage of 12 year – old schoolchildren without (decayed (D) missing (M) and filled teeth (F) DMFT = 0 ), and DMFT > 0 according to type of school (public and private)

<table>
<thead>
<tr>
<th></th>
<th>Public children</th>
<th>Private children</th>
<th>Total number children</th>
</tr>
</thead>
<tbody>
<tr>
<td>D - T</td>
<td>11 (19.3%)</td>
<td>33 (57.8%)</td>
<td>44 (77.2%)</td>
</tr>
<tr>
<td>M - T</td>
<td>1 (1.8%)</td>
<td>3 (5.3%)</td>
<td>4 (7%)</td>
</tr>
<tr>
<td>F - T</td>
<td>2 (3.5%)</td>
<td>7 (12.3%)</td>
<td>9 (15.8%)</td>
</tr>
<tr>
<td>DMFT = 0</td>
<td>158 (92.3%)</td>
<td>188 (81.3%)</td>
<td>346 (86.1%)</td>
</tr>
<tr>
<td>DMFT = 1</td>
<td>11 (6.4%)</td>
<td>38 (16.5%)</td>
<td>49 (20.5%)</td>
</tr>
<tr>
<td>DMFT = 2 or 3</td>
<td>2 (1.2%)</td>
<td>5 (2.2%)</td>
<td>7 (3.2%)</td>
</tr>
<tr>
<td>DMFT &gt; 0</td>
<td>13 (7.6%)</td>
<td>43 (18.7%)</td>
<td>56 (13.9%)</td>
</tr>
<tr>
<td>Mean DMFT</td>
<td>0.08</td>
<td>0.18</td>
<td>0.14</td>
</tr>
</tbody>
</table>

The frequency of tooth brushing and sweet consumption is shown in Table 2. Children from both public school 76.6% and private school 97.8% brush their teeth regularly. The frequency of tooth brushing was not significantly associated with the type of school the children attended P>0.05. However, regular sweet consumption in private schoolchildren (96.5%) was higher than in public schoolchildren (70.2%). This was found to be significant P<0.05.

Table 2: Frequency of tooth brushing and sweet consumption in schoolchildren attending public and private schools.

<table>
<thead>
<tr>
<th>Frequency.</th>
<th>Tooth brushing Public n (%)</th>
<th>Private n (%)</th>
<th>Sweet Consumption Public n (%)</th>
<th>Private n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irregular</td>
<td>40 (23.4)</td>
<td>5 (21.2)</td>
<td>51 (29.8)</td>
<td>8 (3.5)</td>
</tr>
<tr>
<td>Regular</td>
<td>131 (76.6)</td>
<td>226 (97.8)</td>
<td>120 (70.2)</td>
<td>223 (96.5)</td>
</tr>
<tr>
<td>Total</td>
<td>171 (100.0)</td>
<td>231 (100.0)</td>
<td>171 (100.0)</td>
<td>231 (100.0)</td>
</tr>
</tbody>
</table>

Chi – Square, p<0.05

Dental visit behaviour of the schoolchildren in both public school and private schools were poor. Over 80% of the children had never visited the dentist Table 3. The children who had not visited the dentist had significantly higher caries prevalence than other children p<0.05.

Table 3: Percentage distribution of the 12-year-old suburban Nigerian schoolchildren according to their dental visit behaviour

<table>
<thead>
<tr>
<th>Last dental visit</th>
<th>Public n (%)</th>
<th>Private n (%)</th>
<th>Chi – Square, p &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>155 (90.6)</td>
<td>192 (83.1)</td>
<td></td>
</tr>
<tr>
<td>&gt;3 year ago</td>
<td>9 (5.3)</td>
<td>24 (10.4)</td>
<td></td>
</tr>
<tr>
<td>1-3 year ago</td>
<td>5 (2.9)</td>
<td>10 (4.3)</td>
<td></td>
</tr>
<tr>
<td>Within 1 year</td>
<td>2 (1.2)</td>
<td>5 (2.2)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>171 (100.0)</td>
<td>231 (100.0)</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

The present study provides information on prevalence of dental caries, dental attendance and oral health behaviours in a representative sample (n = 402) of 12–year-old from Ile-Ife a suburban population in the southwestern part of Nigeria.

A previous study on 12–year-old in Nigeria (30) reported caries experience of DMFT 0.7. In the present study, the prevalence of dental caries (13.9%) and mean DMFT 0.14 was in the low category according to WHO classification. This is considerably low when compared with recent study in Nigeria (29) and reports from other African countries (24–28). Variation in the methods used and sampling procedures may account for the differences. However, the low DMFT in the present study sample compares favourably with studies in other parts of the world (19,20,38).

The present study sample consisted of schoolchildren. In Nigeria, schools are classified as either private or public depending on the source of their funding. Public schools are funded by the government and tuition fees are subsidized while private schools are funded by individual and high tuition fees are charged. In Nigeria, the type of school a child attends depends on the environment where the child lives and the parent’s social economic status. Most children from high and middle social economic family status attend private schools while children from low income family status attend public schools. The major reason for this difference in the choice of school is finance. The present study sample consisted of schoolchildren from both public and private schools in order to have representative of children from all the social, economic and cultural communities. This will provide a true picture of the condition of the dental health of the target group in the studied population.

The present study showed that the probability of having caries experience was significantly associated with the type of school. A previous study in Nigeria showed that dental caries was higher in children attending fee paying schools than non-fee paying schools (19). The present study is in agreement with this study. The major reason for the difference in caries experience of private schoolchildren and public schoolchildren was due to the fact that children from private schools were financially empowered than public schoolchildren. Thus they had more money to buy cariogenic food and drinks.

The high D component of the DMFT of children examined from both private and public schools indicate the need for dental care and that the prevalence of dental caries need to be controlled. The high proportion of unrestored teeth was consistent with findings from other African countries (16,28,39,40) and some developing countries (41,42). The reason for the high proportion of unrestored teeth in Nigerian children was that dental services were not free. Children seek dental treatment from private dentist which are expensive. Furthermore, lack of dental awareness and low priority placed on oral health care compared with other needs could be responsible for not restoring teeth. A child’s economic background has also been shown to influence the probability of seeking dental care (41).

Sweet consumption in the present study was lower than in other studies from Nigeria (32,39). It has been reported that access to money had direct influence on sweet snacking (39). Regular consumption of sweets amongst school children attending private schools was found to be higher (96.5%) than those in public schools (70.2%). This finding is in support of previous Nigerian studies on increase in sugar consumption among this age group (32) and higher dental caries in children attending fee-paying schools (19). It may be that the children in private schools had more money to buy more sweets. The majority of children attending the public school are from low income families and may not have access to extra money to buy sweets. There were corner shops located around all the schools visited for this study where sweets are being sold to the children. This situation has provided easy access to sweets by school children. It has been observed by the authors that there has been a change in diet of Nigerian youths especially from the traditional diet which was mainly fibrous to cariogenic food and drinks in the last two decades. Therefore, preventive dental health care should incorporate oral health education stressing the role of sweets and other confectioneries in the initiation and spread of tooth decay.

The present study showed that over 75% of the children claimed to brush their teeth regularly with a tooth brush. Other possible methods of cleaning the teeth could be the use of chewing stick or finger. However the poor oral hygiene condition of most of the schoolchildren reflected irregular tooth brushing habits despite the claim that they had regular tooth brushing. This could be due to inadequate brushing time, ineffective brushing technique or both factors. It was also possible that some of the children did not brush as they claim. Data collected by questionnaires have limitation (45). Over reporting is possible regarding desirable outcomes like the frequency of tooth brushing and dental visits while consumption of sweets can be under reported.

Over 80% of the children in the present study had never visited the dentist compared with 11% in Jordan (46) and 42% in China (47). The explanation for this could be that a high proportion of children were satisfied with the status of their teeth and may be it was not a tradition.
to visit dentist in the studied population. This is in agreement with the literature which reported that children did not recognize the need for regular dental visits when they were satisfied with their own dental health and only children who have problems with their teeth seek dental care.

**Conclusion**

The prevalence of dental caries in suburban Nigeria school children is as low as that of children in developed countries of central Europe and lower than the global standard according to WHO classification. Although the DMFT was low in this study, the poor dental visits, poor oral hygiene and high proportion of unrestored carious teeth observed could increase dental caries among suburban Nigerian children in the future. Dental health education and caries prevention programme will minimize caries in these children.

**Acknowledgement**

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**References**


