Oral health in Nigeria

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Most oral health surveys in Nigeria have been sporadic and based on convenience samples. Periodontal disease with deep pocketing occurs in Nigerians at an early age, the prevalence being 15–58% in those aged above 15 years. Caries experience has been reported to vary between very low and low in most studies, but is moderate in some urban communities. Although mean DMFT is below 4 in most communities, the restorative index is extremely low, most carious teeth remaining unrestored. The higher caries prevalence in second than first permanent molars that has been reported is most likely due to a change from traditional to Western-type diet. Other oral health problems include malocclusion, traumatised teeth, dental fluorosis, and oral tumours. The scanty oral health services available in the country are mainly in urban areas. There is, therefore, a need to develop sustainable strategies for national preventive and therapeutic oral health services in Nigeria.

Key words: Oral health, periodontal disease, caries, Nigeria

Most of the oral health surveys in Nigeria have been sporadic and based on convenience samples. This is partly due to the enormous costs and resources required for representative nationwide studies in this huge country with an area of 923,773 km², and a population of over 120 million

Nevertheless, from these sporadic studies and the few nationwide oral health surveys, it is possible to gain an insight into the oral health problems in the country. Periodontal disease and dental caries are the two major oral health problems, while others include malocclusion, traumatised anterior teeth, dental fluorosis, and oral tumours. In this paper, the occurrence of these oral conditions will be discussed, and a brief note added on the oral health services available in Nigeria.

Periodontal disease

Most studies indicate that the prevalence of periodontal disease is quite high, and the occurrence of the disease is related to oral hygiene status and socio-economic class. Deep periodontal pockets occur in a relatively high proportion of young adolescents; and the prevalence increases with age, being 15–58% in Nigerians aged above 15 years (Table 1).

Enwonwu observed the prevalence of destructive periodontal disease, as evaluated by Russell’s criteria, to range between 15% in Northern Nigeria, and 40% in Western Nigerians aged 15–19 years. Besides, Macgregor and Sheiham reported periodontal pockets in
33% and 58% of Nigerians aged 10–19 years and 20–29 years, respectively. In a recent national pathfinder survey, practically all the subjects had a periodontal condition. The prevalence of periodontal pockets 4–5mm deep was 39% at 15 years of age and this increased to 57% among those aged 25–29 years. It is sometimes suggested that there is a difference between periodontal health in urban and rural areas; however, Adegbembo et al. showed that this difference was limited to Nigerians with periodontal pockets 4mm deep (Table 1).

Apart from intense gingivitis, deep pocketing and gingival recession, acute necrotising gingivitis has been reported among malnourished children, usually aged 2–10 years. While Enwonwu observed no cases of this disease among children of high social class, the underprivileged rural children in western Nigeria showed a prevalence of 15%, and this rose to 27% in hospitalised cases of protein-calorie malnutrition. Recent studies suggest that cancerous oris (noma) is highly prevalent among northern Nigerian children who live in close quarters with cattle.

### Table 1 Prevalence of periodontal disease with deep pockets among Nigerians

<table>
<thead>
<tr>
<th>Author</th>
<th>Age (yr)</th>
<th>Part of Nigeria</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enwonwu 1966</td>
<td>15–19</td>
<td>North</td>
<td>15</td>
</tr>
<tr>
<td>McGregor &amp; Sheihah 1974</td>
<td>10–19</td>
<td>West</td>
<td>33</td>
</tr>
<tr>
<td>McGregor &amp; Sheihah 1974</td>
<td>20–29</td>
<td>West</td>
<td>58</td>
</tr>
<tr>
<td>Adebimbo et al. 1995</td>
<td>15</td>
<td>Nationwide</td>
<td>39</td>
</tr>
<tr>
<td>Adebimbo et al. 1995</td>
<td>25–39</td>
<td>Nationwide</td>
<td>57</td>
</tr>
</tbody>
</table>

Dental caries

Caries experience in Nigerians varies between very low in rural areas to moderate in some urban communities. Although most studies indicate that 4–30% of Nigerians have dental caries, the prevalence of the disease appears to be on the increase, especially among certain segments of the urban communities. This increase is most probably apparent, rather than real, as the various studies were cross-sectional, and might have utilised different sampling methods and caries diagnostic criteria.

In 1968, Sheihah observed caries prevalence among rural dwellers in southern Nigeria to be about 33% and 3% in urban and rural areas, respectively. A decade later, Henshaw and Adenubi reported caries prevalence among the rural population of the northern parts of Nigeria to be 32%, and 58% among the urban dwellers (Table 2). In a national study carried out by Adegbembo et al., caries prevalence was approximately 30% and 43% among Nigerians aged 12 years, and 15 years, respectively (Table 2). In a more recent study, only about 3% of 12–15-year-old Nigerians in South-South geopolitical zone had dental caries (Table 2), while in the North Central geopolitical zone, caries prevalence among similarly aged children was 13%.

The mean number of decayed, missing and filled teeth (DMFT) recorded in most epidemiological studies in Nigeria has been below 4, in children and young adults. In a study in urban Nigerian children, mean DMFT varied between 1.2 and 1.3 in 12–21-year-olds. In a national survey by Adegbembo et al., mean DMFT values recorded for Nigerians aged 12 years and 15 years, were 0.7 and 1.3, respectively (Table 2). In a recent study carried out in South-South geopolitical zones of Nigeria, mean DMFT values among 15-year-olds was approximately 1.0; the corresponding value for similarly aged children in North Central geopolitical zone was 2.6.

In most of the studies of caries experience in Nigeria, mean DMFT values have been more or less inversely proportional to the population of caries-free persons. Thus, in those with at least one tooth decayed missing or filled in Lagos, mean DMFT was between 3 and 4, irrespective of age, sex, socio-economic class or ethnic background. Furthermore, in a recent epidemiological study in South-South and North Central geopolitical zones of Nigeria, mean DMFT in those with at least one tooth decayed, missing or filled was between 2 and 3, irrespective of age. It would, therefore, appear that the apparent community changes in caries experience in Nigeria is a reflection of the proportion of persons who develop dental caries as distinct from those who are caries-free.

An intriguing aspect of caries distribution in Nigeria is that caries prevalence in second permanent molars is higher than in first permanent molars, even though first permanent molars erupt six years earlier than second permanent molars. A similar caries distribution pattern has been reported in Uganda, Tanzania, Zambia, and South African Blacks. In Lagos, Nigeria, this caries vulnerability difference was mainly in those with low caries experience. In a study carried out in 15-year-olds in Botswana, DMF values were higher in second permanent molars than first permanent molars in those who apparently were on a traditional diet during childhood. In children who grew up in a more urbanised setting, the results were opposite. The observed differences were attributed to caries vulnerability difference of first permanent molars; and the DMF values of second permanent molars did not vary among the two groups of children.

Thus, the observed caries vulnerability difference between the first
Table 2 Caries experience in permanent teeth among urban and rural populations in Nigeria

<table>
<thead>
<tr>
<th>Author</th>
<th>Age (yr)</th>
<th>Prevalence % Urban</th>
<th>Mean DMFT Urban</th>
<th>Prevalence % Rural</th>
<th>Mean DMFT Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheiham, 1966</td>
<td>&lt;34</td>
<td>33</td>
<td>3</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Henshaw &amp; Adenubi, 1975</td>
<td>10–40+</td>
<td>58</td>
<td>32</td>
<td>2–8</td>
<td>0–2</td>
</tr>
<tr>
<td>Akpata &amp; Jackson, 1979</td>
<td>1–21</td>
<td>42</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adegbembo et al., 1995</td>
<td>12</td>
<td>37</td>
<td>24</td>
<td>0.8</td>
<td>0.5</td>
</tr>
<tr>
<td>Akpata et al., 2003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>15</td>
<td>3</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>15</td>
<td>13</td>
<td>2.6</td>
<td></td>
<td></td>
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</tbody>
</table>

Table 3 Caries experience in deciduous teeth among Nigerians

<table>
<thead>
<tr>
<th>Author</th>
<th>Age (yr)</th>
<th>Prevalence %</th>
<th>Mean dmft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akpata 1979</td>
<td>6</td>
<td>40</td>
<td>1.3</td>
</tr>
<tr>
<td>Noah 1984</td>
<td>6</td>
<td>16</td>
<td>0.6</td>
</tr>
<tr>
<td>Adenubi 1984</td>
<td>8</td>
<td>48</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Other conditions

**Malocclusion**

The distribution of malocclusion differs from that in Western countries29,30 (Table 4). In a study of 11–26-year-old Nigerians, Richardson and Ana29 reported the prevalence of Angle class II malocclusion to be 8–10%, a level much lower than found in Europe and North America. On the other hand, class III molar relationship was observed in 8–18% of the sample, a level much higher than found in Western countries. Similarly, Isiekwe30 reported class II malocclusion in 15% of the subjects, while class III malocclusion accounted for 8%; crowding occurred in 15% of the population, mostly in the anterior region. In contrast, Helm31 observed Angle class II molar relationship in Swedish Caucasian children to be 24.5% and class III relationship 4% (Table 4).

Although the antero-posterior skeletal jaw relationship among Nigerians is in the range estimated by Riedel32 for Western communities33, the prevalence of bimaxillary protrusion has been reported to be very high in Nigerians34.

In a survey carried out to assess the need for orthodontic treatment among rural Nigerians35, 13% of the population was in objective need of orthodontic treatment. Furthermore, girls were found to have more attractive dental appearance and less orthodontic treatment need than boys. However, using the dental aesthetic index (DAI), the need for orthodontic treatment in Nigerian adolescents was reported to be less than that in Caucasians35.

**Traumatised anterior teeth**

Traumatised anterior teeth are commonly seen in Nigerians. In a study carried out among 6–21-year-old Nigerians in Lagos, 12–14% of the sample had traumatised anterior teeth (Table 5), but only 9% had coronal fracture, a majority of which involved enamel only36.
In a more recent study carried out among 12-year-old Nigerians, approximately 11% had traumatic dental injuries (Table 5). Overjet greater than 3mm and incompetent lips were predisposing factors.

The prevalence of traumatised primary teeth is exceedingly high, being approximately 31% in a study carried out at Ile-Ife in the south-western part of Nigeria. In another study at a teaching hospital at Ibadan in the same part of the country, the prevalence of traumatised primary teeth was highest in children aged 4–5 years, and there was no significant difference between boys and girls.

**Dental fluorosis**

Dental fluorosis has been observed in Nigeria, especially in the northern parts of the country, and the condition has been associated with high fluoride concentration in drinking water. In fact, it has been shown that in parts of Northern Nigeria where dental fluorosis is endemic, fluoride ingestion from drinking water exceeds the threshold limit value of 0.004–0.007mg/kg body weight during the period of tooth mineralisation. Besides, in some parts of Nigeria where fluoride concentration in drinking water is within the recommended level of 0.7ppm, moderate to severe fluorosis may be seen in a number of children. This may be due to the relatively high daily water consumption that results in excessive daily fluoride ingestion.

Just as in East Africa, there is a close association between altitude and dental fluorosis.

**Oral tumours**

The prevalence of oral tumours in Nigeria has been based almost entirely on cases seen in treatment centres. Nevertheless, the apparently high incidence of both odontogenic and non-odontogenic tumours in the clinics may be due to the fact that slow growing, painless and non-life-threatening tumours are showing up more frequently in the increasing number of treatment centres.

In a study carried out at the Lagos University Teaching Hospital in southern Nigeria, non-odontogenic tumours accounted for 62.9%, odontogenic tumours 12.9%, cysts and periapical granulomas 23.4%, and tumours of debatable origin 0.8%. In a 20-year retrospective study of children in a teaching hospital in Northern Nigeria, 44.3% were benign non-odontogenic tumours, while 27.7% were malignant. Among the odontogenic tumours seen were ameloblastoma, odontogenic myxoma, and adenomatoid odontogenic tumour.

In Nigeria, ameloblastoma commonly occurs in the second decade of life, and has a predilection for the anterior part of the mandible.

Burkitt’s lymphoma, pleomorphic adenoma and oral cancer are some of the non-odontogenic oral tumours seen in Nigeria. Burkitt’s lymphoma, one of the commonest childhood malignancies in Nigeria, occurs mainly between 2–14 years, and also affects other organs such as the ovaries, retro-peritoneal lymph nodes and kidneys. This tumour may be on the decline in Nigeria. When Burkitt’s lymphoma occurs in the jaws, it leads to disorganisation of developing teeth.

**Oral health services**

Therapeutic dental services are available in the public and private sectors, mainly in the urban areas. As a result, most of the dentists

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### Table 4

<table>
<thead>
<tr>
<th>Author</th>
<th>Age (yr)</th>
<th>Angle’s classification</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Class I</td>
</tr>
<tr>
<td>Richardson &amp; Ana 1973</td>
<td>11–26</td>
<td>62–72</td>
</tr>
<tr>
<td>Isiekw 1983</td>
<td>10–19</td>
<td>76.8</td>
</tr>
</tbody>
</table>

### Table 5

<table>
<thead>
<tr>
<th>Author</th>
<th>Dentition</th>
<th>Age</th>
<th>% prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akpata 1969</td>
<td>Permanent</td>
<td>6–21</td>
<td>12–14</td>
</tr>
<tr>
<td>Otyumu 1994</td>
<td>Permanent</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Otyumu 1996</td>
<td>Primary</td>
<td>1–5</td>
<td>31</td>
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</tbody>
</table>

### Table 6

<table>
<thead>
<tr>
<th>Fluoride level (ppm)</th>
<th><em>Southern zone</em></th>
<th>Fluoride ingestion</th>
<th><strong>Northern zone</strong></th>
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<tbody>
<tr>
<td></td>
<td>Total (mg)</td>
<td>mg/kg body wt</td>
<td>Total (mg)</td>
</tr>
<tr>
<td>0.6</td>
<td>0.671±0.248</td>
<td>0.052±0.020</td>
<td>1.205±0.365</td>
</tr>
<tr>
<td>0.7</td>
<td>0.782±0.289</td>
<td>0.062±0.023</td>
<td>1.195±0.426</td>
</tr>
<tr>
<td>0.8</td>
<td>0.894±0.330</td>
<td>0.070±0.026</td>
<td>1.366±0.487</td>
</tr>
<tr>
<td>1.0</td>
<td>1.118±0.413</td>
<td>0.088±0.033</td>
<td>1.708±0.609</td>
</tr>
<tr>
<td>1.5</td>
<td>1.676±0.620</td>
<td>0.132±0.049</td>
<td>2.561±0.913</td>
</tr>
</tbody>
</table>

* Mean daily water consumption=1117.6 ml; mean body weight=12.7 kg
** Mean daily water consumption=1707.6 ml; mean body weight=11.5 kg
(approximately 3,000) practising in Nigeria are located in urban areas.

In the public sector, dental treatment is provided at Dental Centres – departments in government General/Specialist Hospitals, as well as Armed Forces Hospitals. In the private sector, dental services are available in the few dental clinics located in the major cities. Apart from occasional visits of dentists from the government General/Specialist Hospitals to the rural areas, the rural population has little or no access to modern dental treatment.

There are a few dental hygienists/therapists in the country, but their duties are limited mainly to oral prophylaxis and oral health education, and they function under the supervision of dentists. Thus, there appears to be no coordinated national strategy for preventive dental services in Nigeria.

Conclusions

Periodontal disease with deep pocketing occurs at an early age in Nigerians, 15–58% of those aged above 15 years having deep periodontal pockets. Although caries experience is low (mean DMFT<4 in 15 year olds), restorative treatment need is very high because most of the carious teeth are unrestored. The higher prevalence of dental caries in second than first permanent molars, reported in Nigerian children, is possibly due to a change to a more cariogenic diet.

The distribution of Angle’s malocclusion in Nigerians differs from that in Caucasians, although the distribution of skeletal jaw relationship is practically the same as in Western countries. The prevalence of traumatised teeth is quite high; incompetent lips as well as anterior overjet greater than 3mm are predisposing factors. The increasing number odontogenic and non-odontogenic tumours seen at treatment centres in Nigeria is most likely due to the increasing number of these centres.

There is a need to develop sustainable strategies for national preventive and therapeutic oral health services to cope with the magnitude of oral health problems in Nigeria.

References

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