Oral health in South Africa

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This study describes the oral health status of the inhabitants of, and reflects on possible trends in oral diseases in South Africa. During the past 20 years, three national oral health surveys were conducted in South Africa, the most recent, a national Children’s Oral Health Survey, was conducted between 1999 and 2002. The results of this study show that 39.7% of the 6-year-old children were caries free, which is below the goal of 50% set by the Department of Health (DoH) for the year 2000. The DMFT of 1.1 for the 12-year-old group, however, was below the 1.5 set by the DoH for this group for the year 2000. Based on the Unmet Treatment Need Index more than 80% of caries in children is not treated. The greatest need for the treatment of dental caries in South African children was for preventive services, restorations and extractions. The DMFT for the 12-year-old group in South Africa decreased from 2.5 in 1982 to 1.1 for the current survey. Of the same group, 20.2% of the children presented with definite signs of dental fluorosis. The Dental Aesthetic Index was used to assess the prevalence of malocclusion and 32.3% of 12-year-old children needed definitive orthodontic treatment. The results of national surveys showed a reduction in dental caries severity of the permanent dentition of 12-year-old South African children.

Key words: Caries, oral health, South Africa

The Republic of South Africa is situated on the southernmost tip of the African Continent. The country is demarcated into nine provinces with a total population of approximately 45 million people. The population comprises four main population groups which, in terms of the history of the country, is important to take cognisance of. Prior to 1994, most of the surveys were conducted on a racial base and to make any valid deductions from the available studies, this system of classification will still be used in the paper. The following population groups will be referred to in the discussions: Asians, 2.5% of the population; mainly people of Indian descent. Blacks, 79% of the population; descendants of African peoples who migrated in a southerly direction from central Africa. Coloureds, 8.9% of the population, people of mixed parentage, mainly descendants of the indigenous Khoikhoi people, the Malayan slaves and the White settlers and Whites, 9.5% of the population, descendants of the European settlers, mainly Dutch, British, German, French, Portuguese, etc.

South Africa is classified as a middle income emerging market with an abundant supply of natural resources and well developed financial, legal, communications, energy and transport sectors. The gross domestic product (GDP) was US$432 billion in 2002 and the GDP per capita approximately US$10,000. The major contributors to the economy are services, manufacturing, mining and agriculture.
Like in many other countries of the world the health system is divided into a public and a private sector. Almost 7 million people or 16% of the total population of the country are covered by third party insurance and make use of the private sector for their health services. The remaining 84% or 38 million people are dependant on the State for their health services. The total expenditure on health services was US$9.5 billion in 2000. Of these, approximately US$4 billion was spent in the public sector and US$5.5 billion was spent in the private sector. The delivery of health care in South Africa is based on the Primary Health Care approach which uses the District Health System as the administrative vehicle.

The oral health system is also divided along similar lines, i.e. the private/public division. Oral health services are provided by dentists, dental therapists and oral hygienists registered with the Health Professions Council of South Africa. In 2002, 4,563 dentists, 366 dental therapists and 882 oral hygienists were registered with the Council. Approximately 1,400 dental technicians render services mainly to dentists. More than 80% of the oral health workforce works in the private sector.

**Oral health status, trends and treatment needs in South Africa**

Numerous studies to determine the oral health status of the people of South Africa have been carried out in the past. Most of these studies examined caries in school children while only a few were aimed at adults. Only three studies were conducted on a national scale; Williams in 1984 reported on the dental health status of 12-year-old children representing the whole country. The National Department of Health conducted a National Oral Health Survey in 1988/89 to determine the oral health status of adults and children in the five major metropolitan areas in South Africa. The most recent National Oral Health Survey was conducted during the period July 1999 to June 2002 and was restricted to 4- to 5-, 6-, 12- and 15-year-old children in South Africa.

For the purpose of this paper oral health status will be defined in terms of dental caries, periodontal diseases, edentulousness, malocclusion and dental fluorosis and the age groups 4–5 years, 6 years, 12 years, 15 years and 35–44 years will be used. For the three national oral health surveys conducted in South Africa the World Health Organisation (WHO) guidelines were followed (WHO 1971, 1987, 1997). Where applicable other studies dealing with the oral health status of the inhabitants of South Africa will be included and the most recent data available will be used in the discussions.

**Dental caries**

The following goals with regard to dental caries were set for South Africa for the year 2000:

**Goal 1: 6-year-old group**
To ensure that 50% or more of the children in this age group in South Africa are free of caries.

**Goal 2: 12-year-old group**
To ensure that the mean DMFT of children in this age group in South Africa will be 1.5 or less. The prevalence of dental caries and untreated caries and the severity of dental caries by age group in South Africa are shown in Table 1.

Altogether 39.7% of the six-year-old group in South Africa are caries free. This figure is far below the goal of 50% set by the national Department of Health for the year 2000 for South Africa. The percentage caries consists of untreated (the decayed component of the dmft) and treated caries (the missing and filled components of the dmft) (Table 1). The difference between the caries and the percent-

age untreated caries represents the treated caries. In order to obtain an objective view of the quantity of services provided for the treatment of dental caries, the Unmet Treatment Need Index (UTN)15 is calculated. The UTN, expressed as a percentage, is calculated by dividing the percentage untreated caries by the caries prevalence. Based on the weighted national mean the UTN ranges from 71.6% for the 35- to 44-year-old group to 92.0% for the 4- to 5-year-old group, which mean that for all children in South Africa more than 80% of all caries goes untreated. It must also be borne in mind that the results shown in Table 1 are representative of both the private and the public sectors. One would expect that separate figures for the public sector would even be worse.

In children in general caries is more severe in the primary than in the permanent dentition. Analysis of the different components of DMFT/dmft show high levels of untreated caries in all age groups (decayed component) while an exceptionally high level of missing teeth was also recorded in the adult group. Negligible levels of filled teeth were recorded in all age groups. This observation is consistent with other studies done in South Africa and on the African continent. This may be due to the inadequacy of resources such as oral health personnel and dental facilities as well as a lack of awareness about oral health and dental services amongst the majority of the population.

The DMFT for 12-year-old children is well below the goal of 1.5 set by the national Department of Health for South Africa for the year 2000. The DMFT of 1.1 for 12-year-old children and 1.9 for 15-year-old children is regarded as low in terms of the WHO classification for dental caries for these age groups.

Analysis of DMFT levels for 12-year-old children in South Africa over a period of 20 years...
(1982–2001) shows a gradual reduction in the severity of dental caries. In 19827 a DMFT of 2.5 was recorded for 12-year-old children in South Africa. In the 198810 survey of the five metropolitan areas a figure of 1.7 was recorded. The weighted national mean for the 1999/200111 National Oral Survey was 1.1, showing a reduction of 56% over the period of 20 years or an average 2.8% per year. The percentage of people who need treatment for dental caries, the mean number of teeth needing care per person and the type of care needed for the treatment of dental caries for the different age groups in South Africa are shown in Table 2. The percentage of children in South Africa who need treatment for dental caries ranges from 45–60% and the mean number of teeth needing care per child ranges between 2–3.5. The mean number of teeth needing care for the adult group is representative of extractions and restorations only and no provision is made in this figure for the replacement of extracted teeth. Personal preventive services (fissure sealants and caries arresting care), restorations and extractions were the most common need in children in South Africa. The needs vary widely between the age groups with younger children (4–5, and 6-years) needing more conservative care and extractions than the older groups. For the older age groups (12- and 15-years) the greatest need was for preventive services and restorations. The need for preventive treatment was exceptionally high in the 12-year-old age group while the need for extractions was low in the 12- and 15-year-old groups. The need for restorations was higher than the need for extractions in all age groups examined. The need for crowns and bridges and for pulp care was negligible in the children’s group.

### Table 1

The percentage prevalence of dental caries and untreated caries and the severity of caries by age group in South Africa

<table>
<thead>
<tr>
<th>Age group</th>
<th>Weighted national mean % caries</th>
<th>% untreated caries</th>
<th>DMFT/dmft</th>
<th>D/d</th>
<th>M/m</th>
<th>F/f</th>
</tr>
</thead>
<tbody>
<tr>
<td>4–5*</td>
<td>50.6</td>
<td>46.6</td>
<td>2.4</td>
<td>2.0</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>6*</td>
<td>60.3</td>
<td>55.1</td>
<td>2.9</td>
<td>2.2</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>12</td>
<td>36.9</td>
<td>30.3</td>
<td>1.1</td>
<td>0.8</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>15</td>
<td>51.0</td>
<td>42.2</td>
<td>1.9</td>
<td>1.3</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>35–44 (1988/89)</td>
<td>95.0</td>
<td>68.0</td>
<td>12.3</td>
<td>3.2</td>
<td>8.2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*Primary teeth

### Table 2

Percentage distribution of care needed, the mean number of teeth needing care and the type of care needed for the treatment of dental caries per age group in South Africa expressed as the mean number of teeth needing care

<table>
<thead>
<tr>
<th>Age groups</th>
<th>% needing care</th>
<th>Mean number of teeth</th>
<th>Preventive</th>
<th>Restorations</th>
<th>Crown + Veneer</th>
<th>Pulp care</th>
<th>Extractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4–5*</td>
<td>45.6</td>
<td>2.1</td>
<td>0.5</td>
<td>0.9</td>
<td>0</td>
<td>0</td>
<td>0.6</td>
</tr>
<tr>
<td>6</td>
<td>59.1</td>
<td>3.0</td>
<td>1.0</td>
<td>1.0</td>
<td>0</td>
<td>0</td>
<td>0.9</td>
</tr>
<tr>
<td>12</td>
<td>45.3</td>
<td>2.6</td>
<td>1.8</td>
<td>0.6</td>
<td>0</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>15</td>
<td>49.9</td>
<td>2.9</td>
<td>1.5</td>
<td>1.0</td>
<td>0</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>35–44**</td>
<td></td>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Primary teeth
** 1988/89

### Table 3

Percentage prevalence of periodontal diseases in South Africa

<table>
<thead>
<tr>
<th>Age group</th>
<th>Healthy</th>
<th>Bleeding</th>
<th>Calculus</th>
<th>Shallow pockets</th>
<th>Deep pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (1999–2001)</td>
<td>14.8</td>
<td>15.3</td>
<td>59.9</td>
<td>8.8</td>
<td>0.8</td>
</tr>
<tr>
<td>35–44 (1988/89)</td>
<td>1.9</td>
<td>1.2</td>
<td>66.6</td>
<td>21.4</td>
<td>8.3</td>
</tr>
</tbody>
</table>

WHO for the assessment of periodontal diseases, was employed in the latest two surveys. The prevalence of periodontal diseases in 15- and 35- to 44-year-old South Africans is shown in Table 3. The results show that less than 15% of the 15-year-old children in South Africa presented with healthy periodontal tissues. As in the previous national oral health survey10, the presence of calculus dominates as the most common periodontal condition for all age groups. The dominant calculus complex findings in the study are similar to other studies done in South Africa and other countries.17,18

### Edentulousness

The latest survey to determine the prevalence of edentulousness in the South African population was conducted in 1988/8919. The percentage totally edentulous adults per population group in the age group 35–44 years in South Africa (1988) were as follows: Asian 4.5%,

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Black 6.3%, Coloured 51.6% and White 16.2%.

From all the adults in South Africa in the age group 35–44 years, 12.6% were totally edentulous. Approximately 3.5% of these adults did not possess dentures in 1988\(^{19}\). The results also show large variation in the prevalence of edentulousness among the different population groups with the prevalence of edentulousness among the Coloured population particularly unfavourable at 51.6%.

In all population groups, a larger percentage of females (Black 8.5, Asian 6.2, White 18.6 and Coloured 57.4) than males (Black 3.1, Asian 1.6, White 12 and Coloured 41) were edentulous. These differences were all statistically significant and are not easy to explain. Many think they reflect dentist-patient relationships more than disease occurrence\(^{20}\).

**Malocclusion**

The survey of malocclusion prevalence was limited to the 12-year-old children. The Dental Aesthetic Index (DAI)\(^{14}\) was used to determine the prevalence of malocclusion and to estimate the treatment needs based upon the objective assessment of dental relationships. This particular index has a high reproducibility, is objective and has a low intra- and inter-observer variability.

The results showed that 67.7% do not need treatment for malocclusion while 32.3% need definitive treatment. The DAI consists of 11 variables, which permits analysis to be made for each of the separate components of the index or the index as a whole. Of the separate components of the DAI, maxillary (59.5%) and mandibular irregularities (53.1%) were the most prevalent form of malocclusion observed, followed by crowding (35.8%), spacing (22.1%) and diastema (17.2%).

**Dental fluorosis**

Dental fluorosis is endemic in many parts of South Africa. In September 2000, regulations were published in the *Government Gazette*\(^{21}\), making it compulsory for all drinking water in South Africa to be fluoridated to a level of not more than 0.7ppm fluoride. Fluorosis assessments were included in the 1999–2001 oral health survey to serve as baseline data for monitoring the implementation of water fluoridation and to identify areas where the combined prevalence of mild to severe fluorosis is in excess of 20% and where defluoridation should be considered. The results of the study showed that 65.4% of the children were classified as normal according to the Dean’s Index of fluorosis. More than 20% of 12-year-old children in South Africa show definite signs of dental fluorosis and most of the fluorosis recorded fell in the very mild category (10.4%), while 5.9, 3.1 and 0.7% were classified as mild, moderate and severe respectively. Four areas were identified where the prevalence and severity of fluorosis is too high and where defluoridation should be considered. In three of the areas (Namaqualand, Bojanala and Southern Cape/Karoo) fluoride occurs naturally in the drinking water and in the other area (Mpumalanga Highveld), naturally occurring fluoride in combination with industrial and mining activities were the cause of the high fluorosis.

**Conclusions and recommendations**

Although caries levels in South Africa could be regarded as low in terms of the WHO classification, the high levels of untreated caries in many of the provinces are a cause for concern. This fact combined with the fact that the most frequently used clinical procedure in the public sector is dental extraction makes the implementation of water fluoridation in many areas an absolute necessity.

A very positive observation in terms of dental caries is the huge reduction in dental caries prevalence and severity in children during the past 20–30 years. There is no doubt that this reduction could be attributed to the widespread use of fluoridated toothpaste in South Africa. It is only a matter of time before these positive effects will become visible in the older age groups. The observation of endemic gingivitis and calculus accumulation with a low prevalence of advanced periodontal diseases has significant implications for oral health services as suggested by Louw et al.\(^{22}\). It implies that a periodontal care programme will have to be aimed at the control of slow progressing inflammatory disease, mainly involving scaling, polishing and oral hygiene instruction. Without negating the ultimate need and long term goal for calculus removal, it may, however, prove to be of practical necessity to direct the thrust of care at a satisfactory oral hygiene programme aimed at culminating in self-care and that this should take priority over scaling\(^{23}\). This approach will not only manage the present situation efficiently, but will lead to lower calculus figures in succeeding generations\(^{22}\).

The high levels of edentulousness recorded for the Coloured group in the 1988/89 National Oral Health Survey is a cause for concern. Further research however is needed to determine the current level of edentulousness and to evaluate the impact of the use of fluoridated toothpaste on the prevalence of edentulousness. The results of the fluorosis study show that about 4% of the sample presented with aesthetically unacceptable dental fluorosis. With the implementation of water fluoridation these levels need to be closely monitored to prevent further affliction.

**References**


