Dental caries in primary school children in Nairobi, Kenya

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The purpose of this study was to record the caries status in children attending public primary schools in Nairobi. The sample comprised 513 children, 262 aged 6–8 years and 251 aged 13–15 years. The children were drawn from six randomly selected schools in the city. Clinical examination was carried out in a room with natural daylight, using the WHO (1977) criteria. Fifty-four per cent of the 6- to 8-year-olds and 50% of the 13- to 15-year-olds were caries-free. The mean dmft in the 6- to 8-year-olds was 1.7, and the mean dmfs was 3.5. The mean DMFT in the 13- to 15-year-olds was 1.8, and the mean DMFS was 2.9. The d- and D-components dominated and were mainly located in the occlusal surfaces. The f-component of the dmft and the F-component of the DMFT comprised 1% and 10%, respectively. There was no statistically significant difference ($p > 0.05$) in the prevalence of caries between males and females in the younger age group. In the older age group, however, females had a higher ($p < 0.05$) prevalence than males. In general, the study showed a low caries prevalence in Nairobi children. □ *Dental caries; epidemiology; prevalence*

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Studies in the early eighties (1–3) reported an increasing prevalence of dental caries in African countries. This was attributed to changes in socioeconomic status and traditional dietary habits of the people (1). While these claims cannot be totally discounted, relatively more recent data (4–9) among children in East Africa have shown the prevalence to be rather low compared with data from industrialized countries (10).

The studies cited from Kenya have been carried out in Nairobi. This city has undergone considerable urbanization in the past three decades or so and is now a modern cosmopolitan city with over 1.5 million inhabitants. Although it would be expected that the traditional living conditions and dietary habits of the people have been modified over the years and hence the caries experience presumed to have been influenced accordingly, this does not seem to be reflected by data for caries. Manji (4) reported a mean dft value of 1.5 for 5-year-olds and a mean DMFT of 0.2 for 12-year-olds. Frencken et al. (6) reported a mean DMFT of 0.5 for 12-year-olds. These studies, however, lacked reliable base-line data with which to compare the trends in the status of caries in the city. Moreover, because the studies ignored pre-cavitation lesions, it is likely that they underestimated the prevalence of caries and, seen from a preventive health point of view, the information may be considered inadequate.

The purpose of this study was to record dental caries among the youngest and the oldest groups of children attending public primary schools in Nairobi.

Materials and methods

Children in Kenya usually enter primary school at the age of 6 years, and the education lasts for 8 years. At the time of this study in 1987, there were 154 public primary schools in Nairobi, with more than 130,000 children (Nairobi City Commission Education Department, personal communication).

The sample in the present study consisted of 513 children, 262 aged 6–8 years (138 male, 124 female) and 251 aged 13–15 years

(111 male, 140 female). The children were from six randomly selected schools in the city. On the basis of information from the Education Department, children in one school were of the low, those in another of the high, and those in four of the middle socioeconomic category. Further details on the sampling criteria and the distribution of the children are given elsewhere (11).

Examination was made by one author (P. M. Ng'ang'a) in a room with natural daylight, with the children seated on a chair next to a window. Dental mirrors and probes were used as diagnostic aids, and cotton rolls were used to control moisture.

Caries was diagnosed in accordance with the procedures described in WHO's *Oral Health Survey. Basic Methods* (12). Further to these criteria, we used our own clinical judgement to differentiate between caries and fluorosis and to assess the depth of the carious lesion (whether into the enamel, dentin, or pulp). Examination for caries in the primary dentition in 6- to 8-year-olds was restricted to the deciduous canines and molars.

Chi-square statistic was applied to test for significant differences in the prevalence of caries between the sexes in the separate age groups.

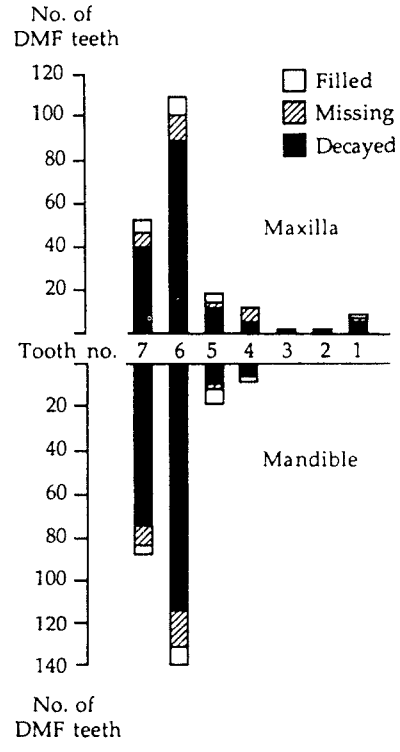

Fig. 1. Number of decayed, missing, filled (DMF) teeth by tooth type in 251 primary school children aged 13–15 years, in Nairobi.

Results

Fifty-four per cent of 6- to 8-year-olds and 50% of 13- to 15-year-olds were caries-free (Table 1).

In the 6- to 8-year-olds the mean dmft was 1.7 ± 2.4 (males, 1.7; females, 1.5). The difference between the sexes was not statistically significant ($p > 0.05$). The d-component accounted for 86%, the m-component for 13%, and the f-component for 1%. The second deciduous molars were more often decayed than the first molars. The mean DMFT in this age group was 0.3.

Table 1. Percentage distribution of caries-free children in two age groups in six primary schools in Nairobi

School no.	Socioeconomic category	6- to 8-year-olds		13- to 15-year-olds	
		(*n*)	% Caries-free	(*n*)	% Caries-free
1	High	45	52	41	71
2	Middle	41	49	41	39
3	Middle	42	48	40	50
4	Middle	42	67	41	49
5	Middle	51	53	48	46
6	Low	41	56	40	45
	Total	262	54	251	50

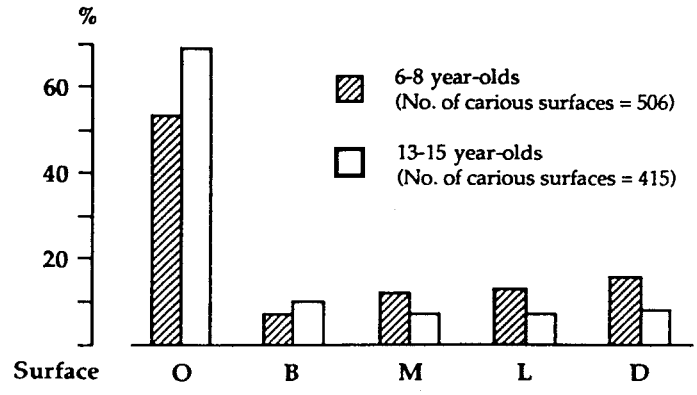

Fig. 2. Frequency distribution of carious lesions by tooth surface in the deciduous dentition in 262 primary school children aged 6–8 years and the permanent dentition in 251 children aged 13–15 years, in Nairobi. O = occlusal; B = buccal; M = mesial; L = lingual; d = distal.

Only two fillings were present in the permanent teeth.

The mean DMFT in 13- to 15-year-olds was 1.8 ± 2.2 (males, 1.6; females, 1.9). The difference between the sexes was statistically significant ($p < 0.05$). The D-component accounted for 78%, the M-component for 12%, and the F-component for 10%. Molars accounted for 86% of the total DMFT. The first molars tended to be more affected than the second, and the mandible more than the maxilla (Fig. 1).

In both age groups most of the carious lesions were in the occlusal surfaces (Fig. 2) and involved the dentin (Fig. 3).

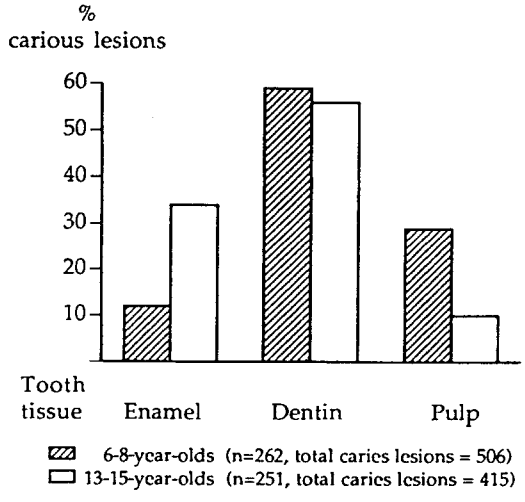

Fig. 3. Clinically assessed depth of caries into tooth tissues among 6- to 8-year-old (deciduous dentition) and 13- to 15-year-old (permanent dentition) primary school children in Nairobi.

Discussion

In general, the pattern and distribution of caries in this study was in agreement with that previously described by Manji (4) and Frencken et al. (6, 13) in Nairobi. The somewhat higher prevalence of caries in our study may be due to the inclusion of pre-cavitation lesions, and also the slightly older age of the groups examined.

The inhabitants of the city of Nairobi have widely contrasting socioeconomic backgrounds. Although relatively inexpensive cariogenic items such as sweets, biscuits, and cakes are readily available from shops, 'kiosks', and street hawkers, their accessibility is, to a large extent, dependent on the ability to afford. However, because the categorization of the children into socioeconomic groups in the present study was based on an aggregate level (school-based), strong conclusions cannot be drawn about the possible influence the socioeconomic factor may have had in the prevalence of caries in this population.

Whereas no statistically significant difference in the prevalence of caries was observed between the sexes in the younger age group, females had a significantly higher caries prevalence than males among the 13- to 15-year-olds. One may speculate that the dietary habits in males and females in the younger age group differed little, while females in the older age group probably indulged in cariogenic items more frequently than males. Another reason for the higher caries prevalence in females may be the

earlier median age of eruption of permanent teeth compared with males, which may be up to 10 months (14).

Residents in Nairobi use naturally fluoridated river water (0.2–0.4 ppm F-) and borehole water (>1 ppm F-) (15). In addition, they have the option of purchasing either a fluoridated or non-fluoridated toothpaste, but no studies are as yet available to indicate the relative preference of the general population for these toothpastes. It is likely, however, that fluoride is one of the significant factors responsible for the generally low caries prevalence.

Most of the lesions diagnosed involved the dentin, and a substantial proportion had penetrated into the pulp. Nevertheless, the filled teeth accounted for only 1% of the total dmft and 10% of the DMFT. This reflects the minimal amount of dental treatment received by the children, which may be explained by the current unfavorable dentist/population ratio, inadequate facilities and resources, as well as poor dental awareness in the general population (16, 17).

The present results indicate clearly that the prevalence of dental caries is relatively low in this population. However, the findings should be interpreted in the light of the limited financial resources and manpower available to cope with dental disease and the poor dental health awareness of the population. Appropriate preventive measures should be instituted and encouraged through dental health education.

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