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Dental caries in 11-year-old Indians in four religious groups

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Key words: Dental caries; epidemiology.

SUMMARY

All the 11-year-old Indian children (n = 308) in Laudium, near Pretoria in 1986, subdivided by religion into Moslem, Tamil, Gujerati and Christian groups, were examined and the dental caries experience and oral hygiene status recorded. For the combined grouping, 17 per cent were caries-free, the mean DMFT was 2,6, mean DMFS was 4,4 and mean OHI-S was 1,0. No statistically significant differences were found for these indices between children in the four religious groups. Religious grouping is a confounding variable that does not require correction in future studies of the Indian community.

OPSOMMING

Al die 11-jarige Indiërkinders (n = 308) te Laudium, digby Pretoria, is gedurende 1986 onderverdeel volgens die Moslem, Tamil, Gujerati en Christelike godsdiensgroepe en is ondersoek vir tandheelkundige karies ervaring en die stand van mondhigiëne is aangeteken. Binne die gekombineerde groep was 17 persent karies vry, die gemiddelde DMFT was 2,6, die gemiddelde DMFS was 4,4 en die gemiddelde OHI-S was 1,0. Daar is statisties geen betekenisvolle verskille tussen die vier groepe ten opsigte van bogenoemde indekse waargeneem nie. Korreksie ten opsigte van godsdiensgroep sal dus onnodig wees in toekomstige studies binne die Indiërgemeenskap.

INTRODUCTION

The South African Indian community was established in 1860 when indentured labourers arrived to work in sugar cane fields, later to be followed by small traders. Initially the community consisted of Tamils from Southern India, followed in time by Moslems and Gujeratis. Each religious group has largely maintained its unique way of life. Moslems are mainly meat eaters (pork excluded) and before praying five times per day, washing of bodily parts, including the mouth is required. For the latter, a Miswaak or brushing twig is often used as well. The Gujeratis belong to the Hindu faith, are not permitted to eat beef or pork, and some are vegetarians. A large number of this group use a tongue cleaner, a ruler-like metal plate, which is passed over the tongue to remove debris each morning. Tamils speak a different language to Gujeratis but share their faith and diet although fewer are vegetarians. The remaining group are the Christians, without specific oral hygiene practices or dietary taboos (Dockrat, 1987).

Anecdotal beliefs within the Indian community include the possibility that the caries experience among Moslems may be lower than other groups because of their religious oral hygiene practices. Also, since the diets of the other groups broadly differ we have wondered whether there are any clear differences in dental caries between the groups.

The objective of this investigation was to compare the dental caries experience among the four religious groups.

MATERIALS AND METHODS

The study area was Laudium, an Indian community of about 30 000 people, situated 7 km west of Pretoria. This is a warm but temperate area with a fluoride concentration in the drinking water of 0,3 ppm.

Prior to the study approval of the research protocol by the Committee for Research on Human Subjects of the University of the Witwatersrand, the education authorities, the children and their parents was obtained.

The study was limited to children aged 11 years on their last birthday in 1986 who attended the 4 primary schools in the area. All the children were examined in the supine position on folding chairs using plain mouth mirrors and disposable curved probes which were changed after every 20 examinations. World Health Organisation (WHO) (1979) caries diagnostic criteria were used during the study but did not include score 1, i.e. initial caries without demonstrable loss of tooth substance. In calculating DMFS, molar and premolar teeth were deemed to have 5 surfaces and incisors and canines 4 surfaces (WHO 1979). Prior calibration of the dental examiner (MD) was effected by using extracted teeth (Cleaton-Jones et al, 1989). Diagnostic reproducibility according to the Modified Percentage Reproducibility (Shaw and Murray, 1975) was 93 per cent and the kappa value was 0,83 (Fleiss et al, 1979), values which were maintained during the study. In order to verify homogeneity of the sample and the possible effect of oral hygiene practices, oral hygiene was assessed using the Simplified Oral Hygiene Index (OHI-S) of Greene and Vermillion (1964). Fluoride usage, the frequency of tooth brushing and the religion practised by the child was determined by direct questioning. The data were analysed in an IBM mainframe computer using the Statistical Analysis System (1985). The Chi-square test was used for comparison of the numbers caries free and using fluoride while the median test was used for DMFT, DMFS and OHI-S scores.

RESULTS

Of the 308 children studied half were boys and half girls. The caries-free percentages were 16,8 for boys, 16,1 per cent for girls and 16,5 for the entire group. No statistically

significant differences were found for results in boys and girls so pooled data will be presented. The number of children in each religious group and details of caries experience are shown in Table I. The community is predominantly Moslem but reasonable numbers of the four groups were seen. The percentage caries-free chldren was nearly twice as high in Christian children (29 per cent) in comparison with the other groups although this difference was not statistically significant (Chi-square test, $p > 0,05$). No statistically significant differences in DMFT and DMFS were found between the religious groups (Median test, $p > 0,05$). Of the surfaces recorded 72 per cent were untreated (Table II). In all groups fillings were more common than extractions; this is shown clearly by the ratio of extracted to filled teeth. For all the groups the teeth most often carious were first permanent molars in both jaws, followed by the second permanent molars and premolars (Fig. 1).

Details of OHI-S scores, brushing frequency and fluoride usage are listed in Table III. No statistically significant differences were found between the religious groups for any of the results. OHI-S scores were similar in all groups; brushing was less frequent among Gujeratis and Christians used the least fluoride.

DISCUSSION

In general the children presented with good oral hygiene and absence of grossly carious teeth. This is emphasised by the low mean DMFT scores which are below the WHO target level of three by the year 2000 (Barmes, 1971). The low mean DMFT and DMFS scores were unexpected since 5-year-old South African Indian children have a high caries experience (Cleaton-Jones et al, 1984), the highest of all South African groups (Cleaton-Jones et al, 1983). The low scores in the present study support the recent observation of low DMFT and DMFS scores noted in a longitudinal study of a similar Indian community some 120 kms south of Laudium (Matejka et al, 1989). In the latter instance children seen at 12 years had a low caries experience in the permanent dentition but had had a high experience in their primary dentition. What is still disappointing in the Laudium children is the low number of clinically caries-free children.

The low caries experience observed in the present study was higher than the mean DMFT scores observed by Manji (1983) in Indians in Nairobi, Kenya, while the 17 per cent caries-free was much less that the 70 per cent recorded in India by Mathew, Eipe and Koshi (1971). When comparison is made to another South African Indian group in Cape Town, a higher mean DMFT score was seen by Steyn et al (1987). Their score of 6,9 is approximately three times higher than in the present study. This can be partly explained by their group being one year older; by their children living in an area with less than 0,05 ppm fluoride in the drinking water compared to 0,3 ppm in Laudium; and by their method of recording caries in the first and third quadrants followed by doubling of the results. The descending order of caries experience from first permanent molars to premolars is similar to observations in East Africa (Manji, Mosha and Frencken, 1986).

Table I: **Caries experience by religious group**

			DMFT		DMFS	
Group	n	Caries-free (%)	mean (sd)	median	mean (sd)	median
Moslem	143	13	2,7 (1,7)	3	4,9 (4,1)	4
Tamil	72	15	2,8 (2,1)	3	4,0 (3,6)	3,5
Gujerati	51	17	2,3 (1,7)	2	4,8 (5,0)	3
Christian	42	29	2,4 (2,1)	2	3,3 (3,7)	2
Total	308	17	2,6 (1,8)	3	4,4 (4,1)	3

Table II: **Caries outcome by surfaces and religious group**

		untreated surfaces	treated surfaces		ratio extracted:
Group	n	decayed	extracted	filled	filled
Moslem	143	506	27	168	1:6,2
Tamil	72	207	2	79	1:39,5
Gujerati	51	169	6	70	1:11,7
Christian	42	106	2	31	1:15,5
Total	308	1 014	37	348	1:9,4

Table III: **OHI-S, brushing frequency and topical fluoride usage**

		OHI-S	Brushing %		Topical	Fluoride
Group	n	mean (sd)	1/day	2 or more/day	fluoride (%)	tablets (%)
Moslem	143	1,0 (0,5)	22	88	24	6
Tamil	72	0,9 (0,5)	21	79	27	10
Gujerati	51	1,0 (0,5)	37	63	28	3
Christian	42	0,9 (0,5)	24	76	10	2
Total	308	1,0 (0,5)	26	74	20	5

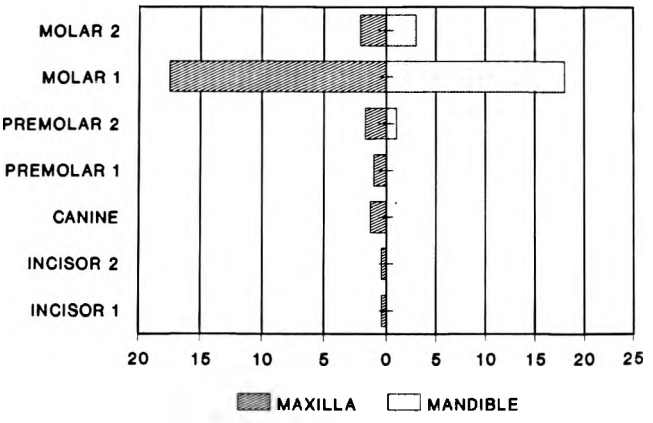

Fig. 1: **Percentage of carious teeth for each tooth type by jaw in all the children.**

When the caries experience was compared across the religious groupings no statistically significant differences were seen, and an anticipated lower experience among Moslems was not observed. This was supported by the lack of difference in OHI-S scores between the groups. Fluoride usage was similar between the non-Christian groups, thereby reducing a possible bias. A potential weakness in the study is that grouping by religion was based on questioning, there was no check on whether Moslem oral hygiene practices were adhered to, nor whether the children ate traditional religion-based diets. This was accepted within the study design which was to screen for broad differences. Since no broad differences were found for dental caries experience and OHI-S scores between the groups, we conclude that in future investigations on dental caries in children of the

South African Indian community, religious grouping is a confounding variable for which there is no need for correction.

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