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1983

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Cleaton-Jones, P., Vickers, A. R., Vickers, K. R. 1983. Oral health in KwaZulu. A pathfinder survey. Journal of the dental association of South Africa; 38(9):539-42

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Journal of the Dental Association of South Africa, **38**, 539-542

Oral health in kwaZulu. A Pathfinder Survey

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Keywords: dental caries; epidemiology; community health.

SUMMARY

A pathfinder survey of oral health was undertaken in kwaZulu. Cluster samples of 6, 12, 16-18, 30-34 and 35-44-year-old subjects were examined. Dental caries prevalence in the permanent dentition ranged bewteen 56 and 92 per cent, while the range of mean DMFT was 1,6 to 8,0, caries was slightly greater in the urban group and filled teeth were notable by their absence. The main periodontal problem was gingivitis.

OPSOMMING

'n Voorlopige ondersoek na mondgesondheid in kwa-Zulu is onderneem. Monstergroepe van 6, 12, 16-18, 30-34 en 35-44 jaar oue persone is ondersoek. Tandkaries-voorkomssyfers in die permanente gebit het tussen 56 en 92 persent gewissel, terwyl die gemiddelde DMFT van 1,6 tot 8,0 gewissel het. Karies het effens meer dikwels in die stadsgroep voorgekom en gestopte tande het glad nie voorgekom nie. Die hoof periodontale probleem was gingivitis.

INTRODUCTION

Dentist to population ratios may vary considerably, for example from approximately 1 to 900 in Sweden to about 1 to 1 000 000 in some African countries (Barmes 1981). At the time of the present study, 1980, the ratio in kwaZulu was 1 dentist to approximately 640 000 people, comprising 5 dentists working from 5 larger hospitals. The purpose of the present investigation was to undertake a pathfinder prevalence survey to obtain data for oral health service planning (World Health Organization 1977).

MATERIALS AND METHODS

kwaZulu is an African governmental authority, comprising some 10 detached land units situated in in the Province of Natal, Republic of South Africa, with a total population of approximately 3,2-million Black people, 98 per cent of whom are Zulu-speaking (Malan and Hattingh 1976). Both rural and urban populations exist.

Selection of the sample for study presented problems in view of the separate land areas and large population. Since a pathfinder survey is based mainly on practical considerations (WHO 1977) it was decided to base the survey in the Pietermaritzburg area, which is the area where the examiner (ARV) was active and is similar to the one in which Jones (1938, 1940) undertook dental investigations. Where necessary, more distant areas were visited (Fig. 1). Representative geographical areas were determined through discussion with local authorities and within these clusters random sampling was used to determine samples for examination. These consisted of school children, hospital outpatients (not including dental outpatients) and industrial workers. The age groups studied were 6, 12, 16-18, 30-3, 35-44 years. Individuals were termed rural if they lived in an agricultural subsistence area, or worked in a large scale commercial farming area. They were termed urban if they lived in "townships", were employed in industry and possessed no subsistence agriculture. Within each of the areas sampled all the available individuals of the various age groups were examined.

Each person was examined in good natural light by a single examiner using plane mouth mirrors, sickle shaped probes, and graduated periodontal probes. Dental caries was diagnosed if the probe caught in a suspicious area, pit or fissure (Staz 1938). Teeth lost due to trauma were recorded as healthy, and an attempt was made to determine whether missing teeth had been removed either because of dental caries or periodontal disease.

Oral hygiene was determined as described by Greene and Vermillion (1964) through measurement of oral debris and calculus followed by calculation of the simplified oral hygiene index (OHI-S). Periodontal disease was assessed using the Periodontal Disease Index (PDI) of Ramfjord (1959). The examiner was calibrated prior to the study by examining a sample of 36 trainee nurses, on two occasions, one week apart. On attaining 80 per cent reproducibility the survey was commenced. Spot checks, during the survey, as recommended by WHO (1977) confirmed the maintenance of the reproducibility level.

Data were recorded on computer forms similar to those

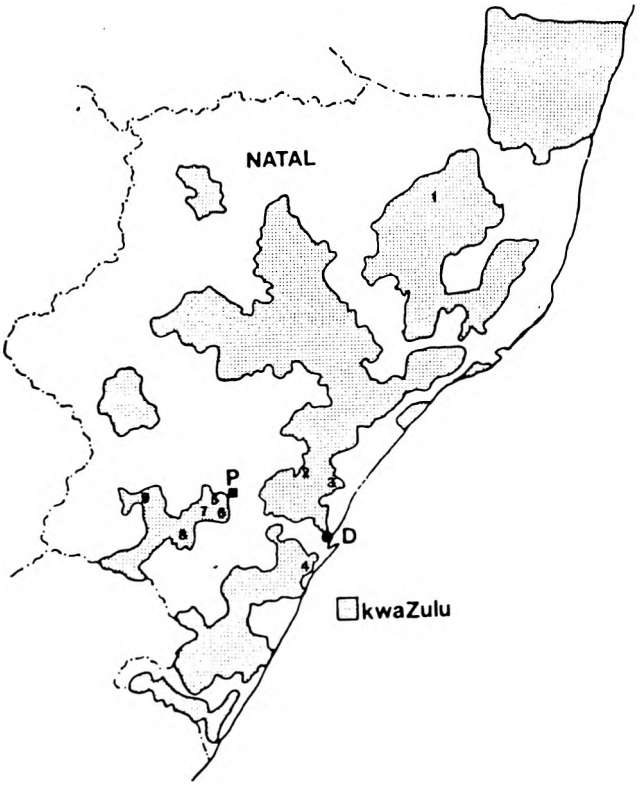


Fig. 1: Map of Natal and kwaZulu showing sampling sites. Rural areas - 1. Nongoma. 2. Montibello. 8. Pholela. 9. Ohlange. Urban areas - 3. kwaMashu. 4. Umbogintwini. 5, 6. Edendale. 7. Georgetown.

of the World Health Organization (1977). The observations were transferred directly to computer punch cards and processed in an IBM 370/158 computer using SPSS (Nie *et al,* 1975). Only descriptive statistics have been used.

RESULTS

A total of 853 individuals, 344 males (40,3 per cent) and 509 females (59,7 per cent) were examined. The breakdown of numbers by age is shown in Table 1. Because the numbers in the groups were low, due to the pathfinder study design, subdivision into males and females was not made.

The percentage prevalences of dental caries and clean teeth (OHI-S = 0) are shown in Fig. 2. In the primary dentition the percentage prevalence of dental caries was greater in rural 6-year-olds than in urban 6-year-olds. The opposite pattern was present in the permanent dentition of the children and adults examined. In the permanent teeth of rural dwellers caries showed a gradual linear increase with increasing age. Among urban people the rise was more rapid, but after 16 years the prevalence remained fairly constant. The percentage of individuals with clean teeth was consistently higher in the urban group.

Mean dmft and DMFT scores are presented in Fig. 3. Mean dmft scores were indentical in rural and urban 6-year-olds. In the permanent dentition mean DMFT scores increased steadily with age and were always higher in the urban group. In the lower half of Fig. 3 the proportions of the components of the mean dmft and DMFT can be seen. Filled teeth were conspicuous by their absence. Decayed teeth formed the major component although missing teeth became more common as age increased.

The pattern of D, M and F in the permanent dentition from 16 years onwards is shown in Fig. 4. Caries in the first permanent molars was less than in the second molars at all ages, and in the 35-44 year group, the third molar was most frequently carious. In the 30-34 year group, the third molar was most frequently carious. In the 30-34 and 35-44 year groups there was little difference in the proportion of missing teeth but in the 35-44

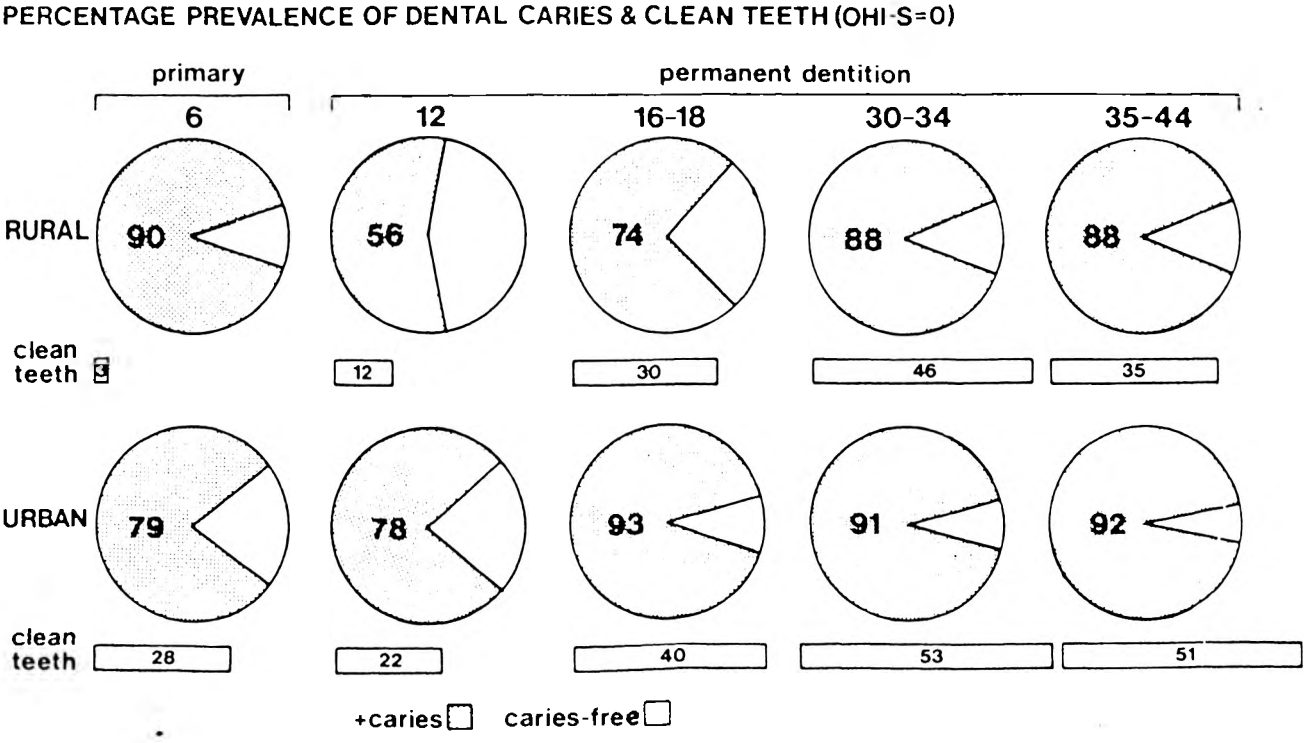


Fig. 2: Percentage prevalence of dental caries and clean teeth.

year group there were more missing teeth in the urban group.

Fig. 5 presents the mean PDI, OHI-S and oral debris (DI-S) scores for the rural groups while Fig. 6 shows the details for the urban groups. In both rural and urban groups mean oral debris was greatest in 6 and 12-year-old children. Thereafter the debris was less. Mean OHI-S scores showed less fluctuation due to an increasing calculus component. Mean PDI scores increased with age, rural scores being consistently higher than urban scores. The various components of the PDI scores are displayed in Fig. 7. From this it is clear that gingivitis (scores 1-3) was the main periodontal problem encountered.

DISCUSSION

Several studies on the dental health of Zulu-speaking people in Natal have been reported in the first half of the present century. Suk (1919) recorded his observations during the years 1913 and 1914, on 1008 Zulu people aged from under 4 to 20 years, and compared these to findings in White children and adults in Prague. He reported that 85-94 per cent of his Zulu subjects had no dental caries and in those with the disease, few teeth were carious.

Authors such as Lennox (1929) and Friel and Middleton Shaw (1931) mentioned that the teeth of Zulu people were excellent, but did not present specific results. Jones (1938, 1940) presented more detailed results. He found caries to be present in 78 per cent of Zulu children aged between 5 and 20 years who attended schools in the Pietermaritzburg area. No articles on dental caries among the Zulu people have been published subsequently. However, because of differences in methodology, the earlier studies cannot be directly compared to the present investigation.

Comparison of dental caries observations in the present study to those reported in the Transvaal (Retief, Cleaton Jones and Walker, 1975; Hirschowitz, Rashid and Cleaton-Jones, 1981 and Walker *et al*, 1981) in which similar criteria and methodology have been used for the diagnosis of dental caries is presented in Table 2. Mean caries prevalence and DMFT scores in the 12-year-old urban groups are very similar but in both the rural and urban areas the 16 to 18-year-old kwaZulu subjects have higher values, except for the study by Walker *et al* (1981) which had values closer to those of the present kwaZulu subjects.

In a pathfinder survey such as this, only broad trends can be shown, but it is clear that a therapeutic and pre-

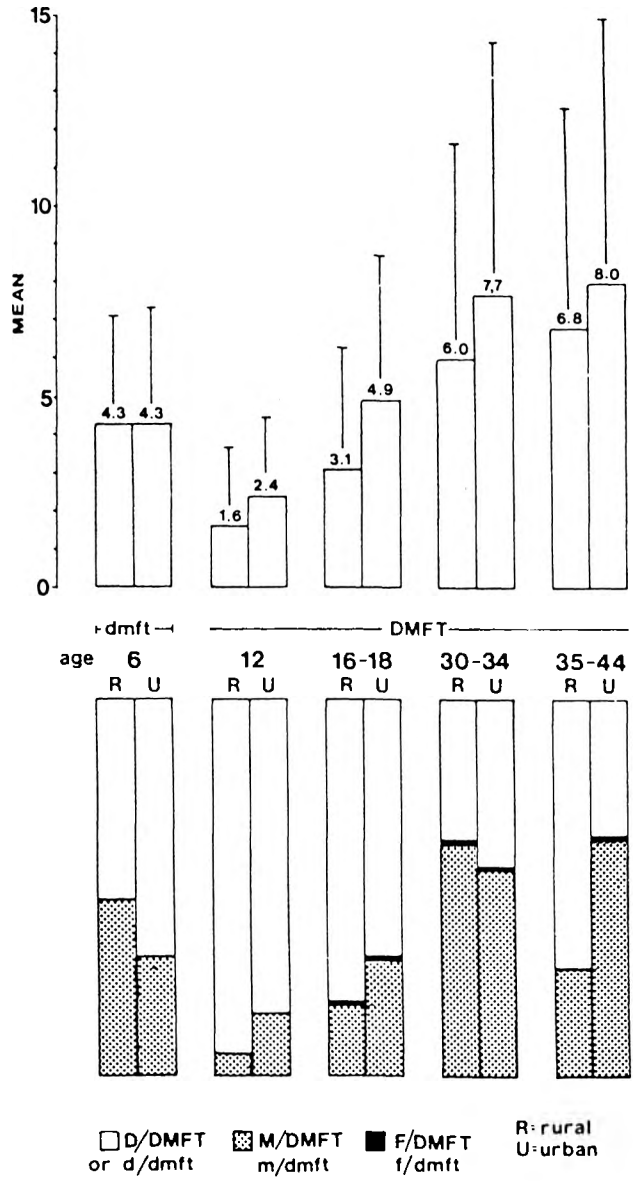


Fig. 3: Mean dmft, DMFT scores and breakdown of components of mean scores.

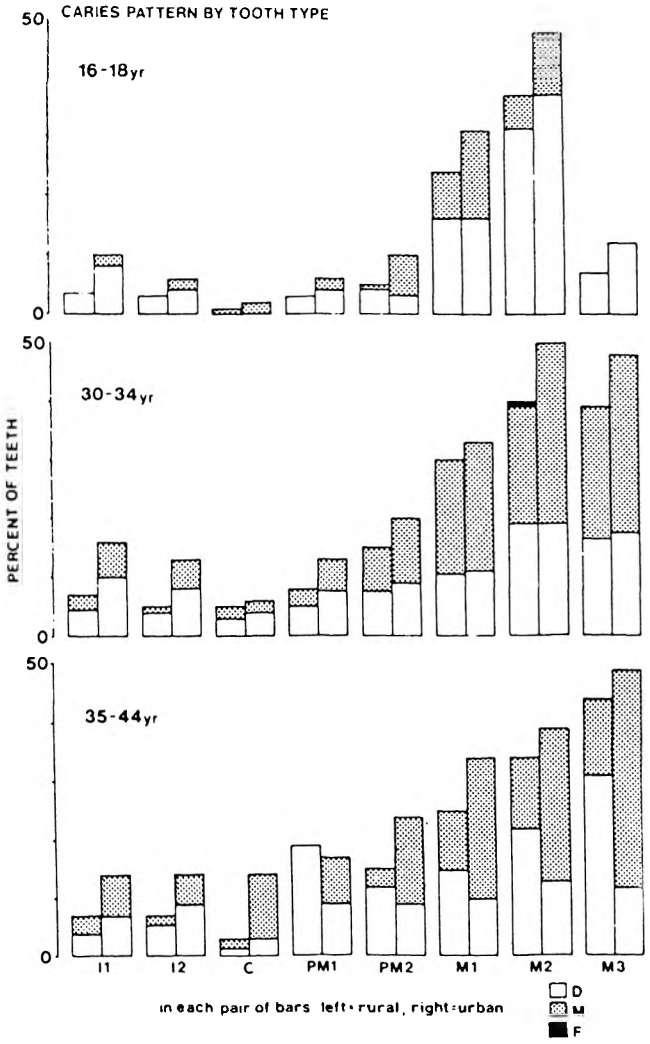


Fig. 4: Caries pattern by tooth type.

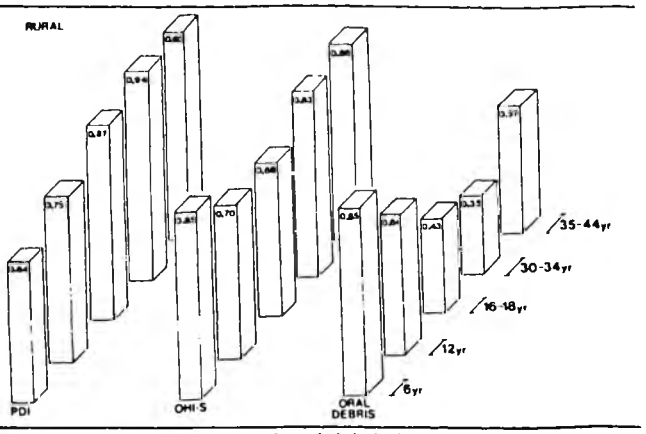


Fig. 5: Mean PDI, OHI-S and oral debris (DI-S) scores for the rural people.

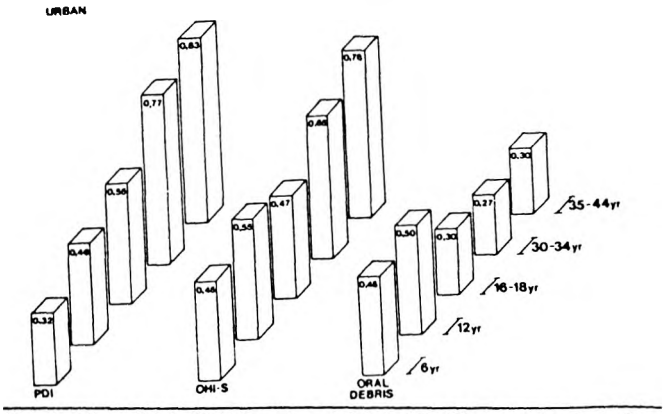


Fig. 6: Mean PDI, OHI-S and oral debris (DI-S) scores for the urban people.

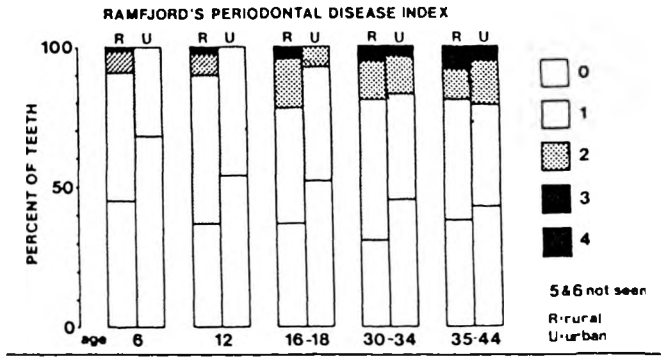


Fig. 7: Breakdown of component of PDI scores.

Table 1: Number of persons examined by environment and age

Age in Years	Rural Group	Urban Group
6	71	43
12	169	41
16-18	90	102
30-34	59	190
35-44	17	71

ventive challenge faces the dental authorities, in rural, but perhaps more so in urban areas, where the need appears to be greater. A solution to the problem is not simple to provide. An increase in manpower may be the first priority since at the time of the survey only five dentists and no dental therapists were employed in the kwaZulu dental department. A suitable dentist (and dental therapist) ratio to population will need to be determined bearing in mind that many individuals may utilize the services of dentists and dental clinics in towns and cities adjoining kwaZulu.

Secondly consideration should be given to the siting of dental services to be of greater availability to the population at risk. Thirdly, the use of such services will have to be encouraged. This study has highlighted the pressing need to bring much needed dental services to the people of kwaZulu.

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Table 2: Comparison of dental caries prevalence and severity between kwaZulu and Transvaal black groups

STUDY	AGE	RURAL		URBAN	
		Caries Prevalence %	Mean DMFT	Caries Prevalence %	Mean DMFT
Transvaal					
Retief *et al* (1975)	16-18	39,7	1,2	67,0	2,1
Hirschowitz *et al* (1981)	12			65,6	2,3
Walker *et al* (1981)	16-18	43,4	1,5	87,3	5,2
KwaZulu					
Present study	12		1,6	78,0	2,4
	16-18	74,0	3,1	93,0	4,9