

Dental caries treatment in Third World populations: a review

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Before discussing present and future problems in providing caries treatment to Third World populations, the provision of medical and health services, of which dental services is a constituent part must be reviewed.

THE PROBLEM OF MEDICAL SERVICES IN DEVELOPED AND DEVELOPING POPULATIONS

USA expenditure on health care in the current year is estimated to be 660 billion dollars (Smith, 1990). This figure is equivalent to the current total Gross National Product (GNP) of Britain. Health care expenditure in the USA expressed as a percentage of GNP, is almost double that of most other western countries. Yet the irony of the situation is that vital statistics in USA are not superior, but inferior to those of many developed populations. In the USA there are extremes of expenditure. On the one hand 1 American in 6 has no health insurance whatever. On the other hand, in one hospital in Los Angeles, a coronary artery by-pass operation costs about 60 000 dollars. Of considerable concern is a statement that only a half of such by-pass grafts are done on patients likely to benefit from the procedure (Smith, 1990). Frequency of caesarian section rises in proportion to socio-economic status, and does not seem to be related to maternal age, parity, birth weight, ethnicity, or complications of pregnancy (Gould, Davey and Stafford, 1989). These examples illustrate the dichotomy of treatment, health care being both deficient and excessive. Criticism of the inefficiency, bureaucracy and short-sightedness of administrators of health care abounds (Smith, 1990).

Turning to Third World countries in Africa, in many huge populations the expenditure on health according to *Time Magazine* (1987) may amount to only 10-20 dollars in the life-time of an individual. In South Africa, concern over the future of health care for our interethnic populations is a topic of acute anxiety and debate, and is touched upon and argued in almost every issue of the *South African Medical Journal*. At one extreme private hospitals make great use of magnetic resonance for diagnostic purposes. In contrast to this, in some "white" public hospitals half the wards are closed for lack of staff. Moreover, in some hospitals for blacks in Zululand, there are no doctors at all (Larsen and Prozesky, 1989).

Thus, in both developed and developing populations there are gross inequalities and inadequacies of medical services and health care. What are the shortcomings in dental services? Are there similar divergencies of treatment? Is the prospect reasonably favourable or is it near hopeless in poor populations?

THE PROBLEM OF DENTAL SERVICE IN DEVELOPED POPULATIONS

In most respects dental services in developed populations are similar to the general medical services described above. For reasons not totally clear, in most western populations, there have been major falls in dental caries scores (DMFT) in the young. In many areas scores have become halved. Because of this change the World Health Organization (1984) has set up various goals to be achieved by the year 2000, chiefly from a point of view of prevention. These include the reduction of the DMFT of 12-year-olds to 3, and edentulousness in the elderly to 20 per cent. Regrettably the diminishing problem of dental caries has led to misuse of dental services.

Simonsen, (1989) noted that sealants had been marketed since 1970, but that only 7.6 per cent of children in the USA aged 5 to 17 years had received the benefits. 'The real reasons for not placing sealants, however, are economic. For the dentist, application of a sealant is not a major profit-generating treatment. More important, however, is that not all third-party payment plans cover the placement of sealant as a benefit. Thus, parents are forced into either rejecting the treatment (if it is offered to them), or of paying for it themselves ... The dental profession cannot long tolerate the low prevention figures seen above without damage to the credibility and perceived sincerity of the profession. Let our future generations benefit from prevention rather than restoration. The goal should be to have 76 per cent, rather than 7.6 per cent, of children protected by pit and fissure sealant by the turn of the century. Why not prevention?'

A 1988 study on caries experience of 11-to-13-year-old children in three Derbyshire communities (Wragg and Anderson, 1988) reported that the average DMFT values found in each school were 2.77, 6.01 and 2.46. It transpired that the gross disparity in values was due to the observation that 'many of the fillings provided for the children in one community were of a prophylactic nature and that primary prevention of dental caries is not being allowed to work'. It was concluded that 'to fill teeth in the absence of any clinical evidence of caries, on the assumption that they are going to decay, can no longer be justified'. Regarding sealants, the authors stressed that 'fissure sealant resins are effective in preventing occlusal caries'.

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Against this background the recent provocative article by Dewar (1988), on 'Is it better to avoid the dentist?' is not astonishing. He asked, *inter alia*, 'The question is whether regular check-ups serve any good purpose at all'. He agreed, with others, that in the UK a capitation fee might considerably reduce the number of times the public see their dentist. Some support for this stance is provided in the Annual Report of the Chief Medical Officer of Health (1990) for UK. It was noted that the mean DMFT values for 3 groups of 12-year-olds namely regular, occasional and emergency-only attenders differed little (3,0, 2,8 and 3,4 respectively).

DENTAL CARIES SITUATION IN RURAL AFRICA

Numerous studies have testified to the very low frequency of dental caries of black children in rural areas. This has been noted in Zambia (Westwater, 1974), Tanzania (Frencken *et al.*, 1989); as well as locally (Walker *et al.*, 1988; Cleaton-Jones and Hargreaves, 1988).

Recently a caries survey was carried out on elderly blacks in a rural area in the Magaliesburg region, 100 km west of Johannesburg. Subjects were 'pensioners' and therefore the poorest of old people (Walker *et al.*, 1991). They are paid every two months at scheduled centres and, because they always assemble early, were available for study. Using experienced black nurses, social workers and specialists on occasion, several health parameters were measured. The caries study was made on 100 each of men and women, of median ages 67 and 68 years. Four per cent were caries free, and 8 per cent were edentulous. Of dentate persons, median DMFT was 13; the range was 0-30, and the mean number of teeth present, 19. These data resemble those reported for an elderly black population in a rural region in Kenya (Manji, Baelum and Fejerskov, 1988). There, 10 per cent were edentulous, and the average number of teeth was 22. A conspicuous finding in these two African series was that no decayed tooth had been filled. This situation stands in contrast to the caries experience of elderly whites (Cutress *et al.*, 1979; Rise, 1982; Brodeur *et al.*, 1985; Burt, Ismail and Eklund, 1985; Ambjornsen, 1986; Seichter and Kluppel, 1986), which indicated that 50-80 per cent were edentulous. Of the dentate, the average number of teeth ranged from 8-14, and the median DMFT ranged from 22-25.

The dental conditions of rural blacks is probably similar to that of traditionally-living persons in other countries in Africa, as well as in other developing countries, such as China (Luan *et al.*, 1989), Papua (Cowan, 1990), and Thailand (Songpaisan and Davies, 1989).

The situation depicted in rural Africa, namely of a very low caries frequency in youth, but many teeth missing in old age, is regarded as a characteristic of past millennia. In Biblical times, King Solomon complimented his attractive lady friend by saying 'Your teeth are white . . . perfectly matched, without one missing' (Living Bible, Canticles 4, 2). Yet the very old were bidden 'let your lips be tightly closed while eating when your teeth are gone' (Ecclesiastes, 12, 4).

THE CHANCES OF DENTAL TREATMENTS

In the rural setting of Third World populations, there are three salient questions. Firstly, pragmatically, is the caries state in

black adults associated with detectable morbidity? Does it really prejudice everyday well-being? Secondly, what dental treatment services could become available to rural blacks, young and old, in view of the very limited financial resources of both State and local authorities? Thirdly, to what extent could dental services be integrated into other medical services?

Firstly then, does caries cause a serious problem in the middle-aged and elderly? Among elderly whites in Western countries, there would seem to be general acceptance of their dental state as endurable; indeed, in many studies it became evident that there was neither the will nor the intention of seeking restorations. As an example, in Denmark a comparison was made of the opinions of elderly persons on one hand, and of clinical examiners on the other, regarding the condition of dentures; 95 per cent of the elderly considered their dental condition to be acceptable, but in the opinion of the clinical examiners only 35 per cent of cases were satisfactory (Kandelman and Lepage, 1982). In another Danish study, half of the nursing home residents questioned rejected restorative and other treatments (Vigild, 1989). In the UK the question has been posed; 'Do we fail our elderly?' (Editorial, 1983). To those affected, the drawbacks included finding a dentist, emergency treatment, service charges, and denture problems. In the USA, being poor, inadequately educated, black, Hispanic, and in indifferent health, were found to be predictors of low access to medical and health care (Dolman, Corey and Freeman, 1988).

In view of such situations in western populations, black adults in rural Africa would be expected to fare even worse. Yet scarcely any of the black 'pensioners' examined complained about their teeth. Accordingly, does the unsatisfactory state of the teeth in these old blacks really matter? In a white population, many seek dental treatment only when in pain. Is their general health demonstrably inferior to that of those who have regular check-ups and treatments? In the furore of correspondence which followed the contribution 'Is it better to avoid the dentist?' (Dewar, 1988), this question was not satisfactorily addressed. Thus, the burden of ill-health from carious teeth may not be large in the general health of older blacks; but undoubtedly life would become easier if at least a modicum of treatment became available.

How can treatment be organised? To meet the need described Dickson (1983), gives details of many regions where village healers or health promoters are trained to be dental workers; they contribute to community health, education, cleaning of teeth, extractions, and drilling and filling. Sheiham (1988) has urged the use of traditional dental health workers in national dental health services, since such people are usually well accepted by the local population, and they understand the local tradition and attitudes to health.

In a study on preventive practices and dental services in a Thai population (Songpaisan and Davies, 1989), it was reported that a significant number of helpers had received advice on oral health from primary health care workers. In two districts, primary oral health care workers received training for two weeks in superficial tooth scaling, and provided care for a large number of subjects. The majority were satisfied with

the care received. Village headmen were sceptical about preventing oral disease, and wanted more frequent visits from mobile dental units. However, the dentists and dental nurses in such units were unable to handle the range of work required, and wanted additional training. Similarly, sub-district health workers and primary oral health workers were frustrated by the limitations of their work and they too wanted additional training to enable them to do fillings and extractions.

In his description of dental care in Papua New Guinea, Cowan (1990) stated that no services were available in 7 of the 19 provinces. A basic form of treatment is provided at field aid posts by orderlies. This usually takes the form of extractions. In centres, services are based at a main dental centre usually located within the provincial hospital. Treatment is also provided by rural dental clinics in an effort to reach as many people as possible. The majority of routine care is provided by dental therapists who are trained in extractions, fillings, oral hygiene and health education, leaving dental officers (dental surgeons) to carry out surgical, prosthetic and administrative work.

Dental care and treatment services have to be organised, whether at field-aid posts, at clinics, or at rural hospitals. The difficulties of inaugurating such services should not be insuperable, and should be rewarding. This has been repeatedly shown in the commencement or intensification of many other aspects of primary health care, as promoted by the World Health Organization and similar authoritative bodies.

DENTAL HELPERS, TRADITIONAL HEALERS, AND GENERAL HEALTH SERVICES

There is a need for medical, dental and public health authorities to co-operate with traditional healers (Mshui and Chhabra, 1982). These healers provide advice on family and other problems, as well as on mental and physical disease. This co-operation exists in India (Fendall, 1981) and in China (Zhu *et al.*, 1989). When the central government's support for 'bare-foot doctors' in China declined, the rural health status as measured by infant mortality rate, immunization coverage, and rate of infectious diseases decreased while per capita income increased.

The antecedents of a series of black appendicitis patients in Soweto were questioned (Walker *et al.*, 1989). It transpired that 60 per cent went directly to a medical practitioner, clinic or hospital and 40 per cent to traditional healers. A quarter of the latter were told by their healers or sangomas to go straight to hospital. This development should be encouraged by all health disciplines, including dentists. In the UK it has been stressed that teeth preservation must be regarded as part of the general public health programme (Macgregor and Balding, 1987). This emphasis has received ample support from local studies. Walker, Shipton and Walker (1990) studied the relationship between teeth brushing frequency and other hygienic practices, such as frequencies of bathing/washing, hair washing, the use of deodorant, and washing of hands after going to the toilet. Observations made on series of 14-year-old secondary schoolchildren (black and white) revealed that tooth-brushing was carried out primarily for mouth cleanliness, with little concern for the preservation of teeth and fear of dentures, and that increases in toothbrushing frequency were almost in-

variably associated with increases in the various hygiene practices described. Accordingly, in general health education, emphasis should be laid on the need for regular toothbrushing as a constituent part of general hygienic well-being.

COMMENT

In a recent Editorial (1990) on structural adjustment and health in Africa, it was noted that living conditions on the continent are likely to worsen and that health and education of rural Africans will fall low on the list of priorities of Western aid agencies. This underlines the need for reliance on locally organised help. In this respect, a village health worker programme recently inaugurated in Nigeria has been described in detail (Bamisiaye *et al.*, 1989). Marsh, (1990), recommends that intensive studies should be undertaken on healers' herbal remedies, particularly regarding their possible anti-cancer and anti-HIV capacities. The *in vitro* screening of traditional medicines for these and other purposes was discussed at a recent informal WHO meeting (Memoranda, 1989).

It seems almost certain that the economic situation in rural Africa will deteriorate. Shortfalls in resources for health maintenance will be rife, and tremendous problems will be caused by the spreading of AIDS. Authorities responsible for national health services in South Africa should take a lead in bringing together orthodox helpers, traditional healers, and technically trained health assistants, not only for dental treatment, but also for the furtherance of improved hygiene and sanitation, immunisation, health education, and other aspects of primary care for the prevention or combating of disease. The outcome could well result in a significant fall in sickness rates and premature death.

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REFERENCES

- Ambjornsen, E. (1986) Remaining teeth, periodontal condition, oral hygiene and tooth cleaning habits in dentate old-age subjects. *Journal of Clinical Periodontology*, **13**, 583-589.
- Annual Report of the Chief Medical Officer of Health of the Department of Health: Dental Health (1990). *British Dental Journal*, **168**, 76-79.
- Bamisiaye, A., Olukoya, A., Ekunwe, EO. & Abosede, OA. (1989) A village health worker programme in Nigeria. *World Health Forum*, **10**, 386-392.
- Brodeur, JM., Simard, PL., Kandelman, D. & Lepage, Y. (1985) Conclusions from a study on the oral health of Quebecers aged 65 and over. *Journal of the Canadian Dental Association*, **51**, 817-819.
- Burt, BB., Ismail, AI. & Eklund, SA. (1985) Periodontal disease, tooth and oral hygiene among older Americans. *Community Dental and Oral Epidemiology*, **13**, 93-96.
- Cleaton-Jones, PE. & Hargreaves, JA. (1988) Dental caries of 11-to-12 year-old South African children and WHO guidelines for the year 2000. *Journal of the Dental Association of South Africa*, **43**, 357-359.
- Cowan, D. (1990) Dental care in Papua New Guinea. *British Dental Journal*, **168**, 265.
- Cutress, TW., Hunter, PBV., Davis, PB., Deck, DJ. & Croxson, LJ. (1979) *Adult Oral Health and Attitudes to Dentistry*, 1976, Wellington: Dental Research Unit. Medical Research Council of New Zealand.
- Dewar, HA. (1988) Is it better to avoid the dentist? *British Medical Journal*, **297**, 1209.
- Dickson, M. (1983) *Where There is no Dentist*. Palo Alto: The Hesperian Foundation.
- Dolman, TA., Corey, CR. & Freeman, HE. (1988) Inequities in dental care access seen in some elderly populations. *Journal of Dental Education*, **52**, 637-642.
- Editorial. (1983) Do we fail our elderly? *British Dental Journal*, **155**, 179.
- Editorial. (1990) Structural adjustment and health in Africa. *Lancet*, **335**, 885-886.
- Fendall, NRE. (1981) Ayurvedic medicine and primary health care. *Tropical Doctor*, **11**, 81-85.
- Frencken, JE., Truin, GJ., Van't Hof, MA., Konig, KG., Mulder, J. & Ruiken, HHM. (1989) Prevalence of dental caries in 7-13-year-old children in Morogoro District, Tanzania, in 1984, 1986 and 1988. *Community Dental and Oral Epidemiology*, **18**, 2-8.

- Gould, JB., Davey, B. & Stafford, RS. (1989) Socioeconomic differences in rates of caesarian section. *New England Journal of Medicine*, **321**, 233-239.
- Kandelman, D. & Lepage, Y. (1982) Demographic, social and cultural factors influencing the elderly to seek dental treatment. *International Dental Journal*, **32**, 360-370.
- Larsen, JV. & Prozesky, DR. (1989) The plight of rural hospital doctors. *South African Medical Journal*, **75**, 551-552.
- Living Bible. (1971) Canticles, 4, 2 and Ecclesiastes, 12, 4.
- Luan, WM., Baelum, V., Chen, X. & Fejerskov, O. (1989) Tooth mortality and prosthetic treatment patterns in urban and rural Chinese aged 20-80 years. *Quintessence International*, **17**, 221-226.
- Macgregor, IDM. & Balding, JW. (1987) Toothbrushing frequency and personal hygiene in 14-year-old schoolchildren. *British Dental Journal*, **62**, 141-147.
- Manji, F., Baelum, V. & Fejerskov, O. (1988) Tooth mortality in an adult population in Kenya. *Journal of Dental Research*, **67**, 496-500.
- Marsh, J. (1990) Conference 'from powerful plants to powerful medicines'. *Lancet*, **335**, 1150-1151.
- Memoranda. (1989) *In vitro* screening of traditional medicines for anti-HIV activity: Memorandum from a WHO meeting. *Bulletin of the World Health Organization*, **67**, 613-618.
- Mshiu, EN. & Chhabra, SC. (1982) Traditional healers and health care delivery in Tanzania. *Tropical Doctor*, **12**, 142-143.
- Rise, J. (1982) Analyses of dental status among old-age pensioners in Norway. *Community Dental and Oral Epidemiology*, **10**, 282-286.
- Seichter, U. & Kluppel, HJ. (1986) State of oral health and prevalence of root caries in an elderly population. *Caries Research*, **20**, 190.
- Sheiham, A. (1988) Integrating dental care with general health care. *World Health*, October, 28-29.
- Simonsen, RJ. (1989) Why not prevention? *Quintessence International*, **20**, 785.
- Smith, R. (1990) Crisis in American health. *British Medical Journal*, **300**, 765-766.
- Songpaisan, Y. & Davies, GN. (1989) Attitudes to oral health, preventive practices and dental services in a Thai population. *Community Dental Health*, **6**, 377-390.
- Time (1987) Global war on AIDS. 25 May, 40-47.
- Vigild, M. (1989) Dental caries and the need for treatment among institutionalized elderly. *Community Dental and Oral Epidemiology*, **17**, 102-105.
- Walker, ARP., Walker, BF., Dison, E. & Walker, C. (1988) Dental caries and malnutrition in rural South African black ten- to twelve-year-olds. *Journal of the Dental Association of South Africa*, **43**, 581-583.
- Walker, ARP., Walker, BF., Manetsi, B., Tsotetsi, NG. & Segal, I. (1989) Appendicitis in Soweto, South Africa: Traditional healers and hospitalization. *Journal of the Royal Society of Health*, **6**, 190-192.
- Walker, ARP., Shipton, E. & Walker, BF. (1990) Toothbrushing frequency and personal hygiene practices in 14-year-old black and white children in South Africa. *South African Journal of Epidemiology and Infection*, **5**, 33-36.
- Walker, ARP., Dison, E., Walker, BF., Walker, C., Cassim, FA. & Walker, AJ. (1991) Dental caries in rural elderly black 'pensioners'. *South African Journal of Epidemiology and Infection*. (In press).
- Westwater, K. (1974) A study of the caries prevalence in first permanent molars of rural Zambian schoolchildren. *Journal of Dental Research*, **2**, 185-189.
- WHO Expert Committee (1984) Prevention Methods and Programme for Oral Diseases. Tech. Rep. Ser. No 713. Geneva: World Health Organization.
- Wragg, KA. & Anderson, RJ. (1988) The difference between the caries experience of 11- to 13-year-old children in three communities in Derbyshire. *Community Dental Health*, **5**, 29-38.
- Zhu, N., Ling, Z., Shen, J., Lane, JM. & Hu, S. (1989) Factors associated with the decline of the Cooperative Medical System and barefoot doctors in rural China. *Bulletin of the World Health Organization*, **67**, 431-441.

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