Oral Health

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Primary oral health care for developing countries

A model for the delivery of oral health care in rural areas of developing countries has been derived from studies in Papua New Guinea and Thailand. It gives special attention to self-help and self-reliance at village level; it provides for training of each category of personnel, with a clearly defined career structure, and can be adapted to respond to diverse epidemiological, demographic, social and economic circumstances.

The first systematic oral health services were particularly concerned with schoolchildren. School dental services concentrated on curative and restorative treatment for dental caries. However, a restorative strategy does not reduce the overall prevalence of the disease unless accompanied by preventive measures. Furthermore, the provision of systematic oral health care for children does not necessarily secure satisfactory oral health in adults. It should also be noted that if too much attention is given to symptomatic treatment and repair, costs rise so rapidly as to constitute a major political, social and economic problem.

Many years ago a pioneering programme in New Zealand established that dental nurse/therapists could be trained in two years to carry out many operative procedures competently and efficiently. There have been outstanding advances in materials, instruments, equipment and techniques for curative and rehabilitative treatment, but in the main they cannot be transferred to developing countries. On the other hand, biological and social science research has led to preventive measures from which these countries can benefit.

Challenge to restorative dentistry

Although entrenched systems of dental education and oral health care often resist change, the basic principles of classical restorative dentistry are now being challenged (1).

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The situations in Papua New Guinea and Thailand

In both countries more than three-quarters of the population live in rural areas, and both have a strong commitment to primary health care. In Thailand the key primary health care workers in the countryside are village health volunteers and village health communicators. These are villagers who have an interest in health matters and a willingness to help others without remuneration. They are assisted by traditional healers, teachers, mothers, youth groups and monks. In Papua New Guinea the same functions are performed by community health workers, who, however, receive payment; they are assisted by teachers, members of village development committees, and traditional healers.

Dental services

After a six-year course, new dental graduates in Thailand are required to spend three years in government service at district or provincial level. A community care model for oral health has been developed at the Intercountry Centre for Oral Health in Chiangmai, with the basic aim of providing oral examinations, preventive advice and emergency care for the relief of pain to communities by workers in the medical service at village level. This model, which has operated since 1985 in the provinces of Chiangmai and Lamphun, provides for the training of three categories of personnel: status recorders (oral health examiners), oral health educators, and village scalers (2).

In some provinces in Papua New Guinea, provincial dental officers provide a one-month course of training in oral health for community health workers, in conjunction with the Department of Health's training branch. The duties of these workers include oral health education, oral hygiene instruction, oral screening, first aid for the relief of pain (using sedative dressings) and infection, local anaesthesia, extraction, and referral. Schoolteachers are encouraged by dental officers and dental therapists to contribute to health education and to organize and supervise toothbrush drills for schoolchildren.

Pattern of oral disease

In Thailand the prevalence of dental caries is very much lower in permanent dentition than in primary dentition and there is a much higher involvement of the primary maxillary incisors than of the mandibular incisors. The possibility that this is related to perinatal malnutrition is being investigated.

The prevalence of dental caries in permanent dentition is six to ten times higher in metropolitan Bangkok and two to three times higher in urban areas of Papua New Guinea than in villages in either country.

Dental care should be based on the principles of primary health care, with community participation and a bias towards the prevention of disease rather than the treatment of its effects.

In Papua New Guinea, dental decay occurs most often in pits and fissures on the biting surfaces of molars and premolars (3), a problem that could be largely eliminated by the application of fissure sealants to newly erupted teeth.
In Papua New Guinea, periodontal disease is the major cause of oral pain and discomfort, the premature loss of teeth, and inefficient mastication associated with significant nutritional effects. The same is true, although to a slightly lesser extent, in rural Thailand. Periodontal disease could be largely prevented and its progress controlled by regular prophylaxis and the consistent use of simple methods of oral hygiene.

In both Thailand and Papua New Guinea, calculus dominates the periodontal picture in people aged between 15 and 19 years.

In Papua New Guinea, tooth loss due to dental caries is negligible in rural areas and does not become significant until the age of 35 in urban areas.

In both countries, periodontal disease is the predominant cause of tooth loss among people aged 35 and over, particularly in rural districts.

Between 1958 and 1983, oral cancer accounted for 11–22% of all cancers in Papua New Guinea. Leukoplakia and leukoedema (an abnormality of the buccal mucosa resembling early leukoplakia) are more prevalent in Papua New Guinea than in Thailand (4, 5). In Papua New Guinea there is a strong association between the prevalence of leukoplakia and the chewing of betel nuts.

### Demand for dental treatment

In Thailand approximately 20% of the people use the dental services, the proportion in rural areas, however, being only about 10%; in Papua New Guinea, 6% of the total population and 8% of the school population use the dental services. In Papua New Guinea the predominant demand is for extractions and simple fillings. Complex procedures requiring the work of trained dental officers form less than 4% of the clinical load. Between 1981 and 1988 there was a decline in the number of prophylaxes as a percentage of total operations from 7.1% to 3.2% in the general dental service and from 17% to 5% in the school dental service.

### Perceptions of oral problems

In rural Thailand, 41% of people aged 15–44 claimed to have a current problem with their teeth or mouth. On the other hand, a general lack of appreciation of periodontal disease as a clinical problem was highlighted by the fact that 97% of people who claimed to have no oral health problem were found to have clinical signs of this kind of disease (6).

In Papua New Guinea, 53% of people aged 15 and over claimed to have a current problem with their teeth and mouth; of these people, 42% said they had symptoms related to caries and 41% that they had symptoms related to periodontal disease.

### Care providers’ views

Primary oral health workers in Thailand felt very frustrated with the narrowness of their responsibilities as examiners, health educators or scalers and with their inability to provide other services such as filling and extraction, as required by villagers. Dental
nurses requested refresher courses so that they could broaden the scope of their work, and further training that would help them to teach village health volunteers and village health communicators.

Comparable dissatisfaction was expressed by dental officers and dental therapists in Papua New Guinea, although here the comments were rather more specific and frequent reference was made to: shortage of clinical materials for everyday use; absence of a satisfactory maintenance service for equipment; a lack of transport to bring patients to clinics and to take dental officers and therapists to villages and schools; excessive time spent by therapists on the filling of pits and fissures in molars instead of on the prevention and control of periodontal disease; a lack of opportunities to expand knowledge and skills through refresher courses; and the need for a clear career pathway.

System transfer

Following a large survey of urban and rural children in Papua New Guinea during 1958, it was recommended that a school dental service should be established and staffed by dental nurses. A further recommendation was that special attention should be given to the prevention and treatment of caries in primary school children (7). These recommendations were accepted and the training of dental nurses commenced in 1960.

It is interesting to note that in New Zealand the prevalence and rate of progress of caries have been greatly reduced thanks to fluoridation, other fluoride therapy and intensive health education. Diagnostic criteria have been altered and policy has changed from “When in doubt, fill” to “When in doubt, don’t fill”.

It is now clear that the policy of giving top priority to the treatment of caries in schoolchildren in Papua New Guinea was wrong and that it is unwise to transfer, unchanged, a system of delivery of care from one country to another.

General principles

The following general principles emerge from the observations made in Papua New Guinea and Thailand.

- Oral health is an integral part of general health.
- Dental care should be based on the principles of primary health care, with community participation and a bias towards the prevention of disease rather than the treatment of its effects.
- Dental caries, periodontal disease and, to some extent, oral cancer are preventable.
- Epidemiological data on the prevalence, severity and age distribution of oral diseases and conditions are essential prerequisites for:
  - determining rationally the type of care appropriate for particular groups of people defined by age and geographical location;
  - determining the different weights to be placed on preventive, health educational, curative and rehabilitative services;
  - deciding on the categories and numbers of oral health care and primary health care personnel;
  - guiding the development of basic training for oral health care personnel.
- It is impossible to provide ready-made oral health programmes that are appropriate for all countries or even for
all groups of people in a given country. Each country has distinct demographic, political, socioeconomic and cultural characteristics.

• It is preferable to take treatment services to the people by means of mobile teams instead of bringing the people to fixed clinics. Relatively inexpensive, sturdy and portable dental equipment currently under development should make this possible in the near future.

• The oral health problems of developing countries cannot be solved by dentists alone. Many tasks previously undertaken by dentists should be delegated to dental auxiliaries, teachers, primary health care workers and volunteers. However, delegated duties and responsibilities should be clearly defined.

• Within the service there should be a well-defined career structure and opportunities for expanding knowledge and skills through refresher courses and for advancement through extension services, continuing education and postgraduate education.

• A clear distinction should be made between the roles of dentists in private and public practice. In addition to having clinical skills, the public health dentist is required to act as the leader of the oral health team, and to this end should receive extra training that places emphasis on administrative and managerial skills, human relationships, evaluation, and the ability to work with personnel in other health and community development programmes. Where no dental school exists, dental officers should be trained under a curriculum specifically orientated towards their future duties and responsibilities.

• The precise nature of duties and responsibilities delegated to others by dentists is bound to vary from country to country. In general, however, all personnel should be involved in health promotion, health education, prevention, emergency care for the relief of pain and infection, and referral.

A model for oral health care in rural areas of developing countries

This model is based on the promotion of a primary oral health care approach and gives prominence to self-help and self-reliance at village level. It provides for direct entry to training courses for each category of personnel and an opportunity for upward movement along a clear career path.

For community health workers a four-week course is envisaged, leading to a certificate in primary oral health care and enabling the participants to undertake:

— dental health education, with special reference to methods of oral hygiene designed to prevent and control periodontal disease;

— oral screening of adults and children for periodontal disease, dental caries and oral cancer;

— emergency first aid for the relief of oral pain and infection, including the use of local anaesthesia for the extraction of teeth that cannot be saved and the insertion of sedative dressings;

— sterilization of instruments;

— postoperative care;
— training of community leaders and voluntary health workers in the promotion of oral health;

— referral of patients to a health centre or mobile unit.

The model encompasses courses of training provided by provincial dental officers with the assistance of the education and health authorities. The requirement for advancement is three years’ field service and additional training to raise the community health workers’ qualifications to grade 10 level. This would allow them to enter the course for dental hygienists.

Schoolteachers would receive a one-week course of training by dentists and dental therapists under the auspices of the teacher-training programme, enabling them to undertake:

— oral screening of children to detect early signs of gingivitis;

— supervision of daily toothbrush drills organized by senior students as role models;

— supervision of weekly fluoride rinsing or daily taking of fluoride tablets;

— referral to community health workers.

Dental hygienists would receive a six-month training course leading to a certificate in preventive dentistry and enabling them to:

— develop practical skills in oral health education with special reference to dietary counselling, oral hygiene and preventive practices generally;

— conduct detailed oral examinations for the diagnosis of periodontal disease, dental caries and oral cancer;

— recognize high-risk groups requiring special attention and referral;

— develop clinical skills in oral prophylaxis, including the removal of supra- and subgingival calculus in high-school students and in adults aged up to 30 years;

— apply fissure sealants to pits and fissures of permanent molars and premolars;

— administer local anaesthesia for the extraction of teeth that cannot be saved;

— apply sedative dressings;

— refer patients.

The prime targets for recruitment to the dental hygienist programme would be dental orderlies (dental assistants) and community health workers. However, direct entry for anyone with a grade 10 qualification would also be allowed. The requirements for advancement would be three years’ field service and the raising of basic qualifications from grade 10 to grade 12. Successful fulfilment of these prerequisites would enable hygienists to apply for admission with six months’ credit to the course for dental therapists.

Dental technicians would receive a two-year course leading to a certificate in dental technology. Direct entry would be available to anyone with a grade 10 qualification. The duties would include the construction of partial and full dentures and the servicing of dental equipment and instruments. After three years there would be an opportunity for advancement through a six-month course leading to a diploma in dental technology.

Dental therapists would attend the standard two-year course, leading to a diploma in dental therapy, except that the curriculum would give reduced emphasis to the repetitive preparation and filling of class I cavities both in the phantom head and in patients, and increased attention to the
prevention and control of periodontal disease, the clinical problems of adults, teamwork in oral health care, and the development of communication skills aimed at imparting facts on the prevention of oral disease and motivating people to follow preventive practices. The requirement for direct entry would be a grade 12 qualification but provision would also be made for advancement after three years’ field service. Successful completion of these prerequisites would enable the therapist to apply for entry to the course for dental officers with one year’s advanced credit.

Dental officers would receive a three-year course leading to a diploma in dental science. The curriculum would have a strong practical bias, embracing diagnosis, prevention, control and the provision of clinical treatment for the major oral diseases in the country concerned. It would also give prominence to administrative and managerial skills so that graduates would be able to organize and lead oral health teams at the district and provincial levels. The requirements for direct entry would include a grade 12 qualification.

If a university degree course is available, dental officers would, after three years’ field service, be eligible for admission with two years’ advanced credit. The course for dental surgeons would place emphasis on the planning, organization and administration of oral health services at the central, district and provincial levels, and on advanced curative and rehabilitative care.

After three years’ field service a dental surgeon or dental officer would be eligible to be considered for the award of a fellowship for postgraduate study in public health and, to a limited extent, for additional specialist training.

Other features of the model would include:

— provision of regular short refresher courses for all categories of oral health personnel;
— provision of mobile teams, each consisting of a dental officer, a dental therapist and a dental hygienist to visit schools, village aid posts and subdistrict health centres on a regular basis as soon as transport and equipment were available.

If such a plan were brought to fruition the possibility would exist that the vast majority of people would retain their natural teeth throughout life.

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References