Green College Lectures: 1984

Medicine in the Third World

J K G WEBB

The Third World, if we include China, has a population of three billion, which is three quarters of the world's population. If we use the Brandt Commission's distinction between north and south, the countries of the south are characterised by their relative economic weakness. They live on one fifth of the world's income and possess less than one tenth of the world's manufacturing capacity. Their development embraces a very wide range and this diversity applies equally to their medicine and occurs even within individual countries, with the most sophisticated form of medical care operating beside the most primitive. The medicine of centres like the universities of the West Indies and Ibadan or the All India Institute of Medical Sciences is impressive. But such centres stand out because they are not characteristic, and I wish to focus on the characteristic—that is, on the health problems that tend to be common to all Third World countries, and the services relevant to those problems.

Tropical diseases

Most of the Third World lies in the tropics and part of its burden is imposed by the so called tropical diseases. In 1977 the World Health Organisation (WHO) identified six diseases to be the focus of a special programme: malaria, schistosomiasis, filariasis (including onchocerciasis), trypanosomiasis (including Chagas' disease), leprosy, and leishmaniasis. They estimated that 600 million people were affected by one or other of these diseases, with many more at risk. The diseases are frequently an obstacle to development, and lack of development is an obstacle to their control. The special programme is concerned with the development of research on a worldwide basis with a long term goal of instituting effective controls.

Malaria

Of these six diseases malaria probably imposes the most massive burden. In the 1950s there were some 250 million cases a year with two and a half million deaths. Residual spraying with dichloro-diphenyl-trichloroethane (DDT) proved a highly effective control measure which eradicated the disease from some countries. This led the Eighth World Health Assembly in 1955 to commit itself to a global eradication programme. This aimed specifically at stopping transmission and eliminating the reservoir of infection over a limited period of time, so that when the programme ended there would be no

resumption of transmission. During the next 15 years the effort was immense, and at its height 65 000 tons of DDT a year was being applied. The initial success was dramatic. Yearly mortality in India due to malaria dropped from three quarters of a million to 1500. Fourteen years later, in 1969, a reappraisal showed a sobering picture. Resistance to DDT, the exophilic behaviour of some anophelines, the almost inevitable incompleteness of the spraying of houses, and above all the logistical burden and immense cost of the programme, with financial support not being maintained at the required level, led to a redefinition of the goal from "eradication" to "control." In 1975 it was estimated that of the 2000 million people living in malarious areas, eradication had been achieved for 820 million, control programmes were in operation for 850 million, but for 350 million living in highly endemic areas no protection was available. The picture today is still worse, with a global increase, particularly in east Asia and Central America. Resistance to chloroquine in *Plasmodium falciparum* is extending, and resistance to the combination of sulphonamide and pyrimethamine used against parasites resistant to chloroquine is also appearing. The limitations of the present tools for control have highlighted the need for a new approach and have given a further impetus to work on the immunology of malaria and the development of vaccines, both sporozoite and merozoite.

Schistosomiasis

The second of the WHO's six diseases, schistosomiasis, was estimated in the mid-60s to affect 150-200 million people. In this disease the adult worms rest in the small blood vessels adjacent to the gut (*Schistosoma mansoni*) or bladder (*S. haematobium*) where the female produces unbelievable numbers of eggs that are passed in stools or urine, often accompanied by some bleeding. Heavy infection is possible with few symptoms, but gross hepatosplenomegaly occurs in about 4% of cases, and progressive disease of the affected organs is likely.

Infection is acquired in water, where the eggs excreted in stools or urine release free swimming miracidia. These find and enter snails, in which they form sporocysts, each capable of yielding up to a quarter of a million free swimming cercariae in a few weeks. These can penetrate human skin and migrate via the blood stream to the favoured organ, where they mature to adult worms. Schistosomiasis is therefore prevalent where people live in close contact with fresh water containing one of the relevant species of snail.

The problem has been magnified by contemporary "development." Increasing food production often means irrigation, which, in some instances has led to vast extensions of water harbouring the intermediate host snail. In Egypt, for example, the High Lake formed by the Aswan Dam, which covers an area of 5000 km², has been colonised by biomphalaria snails from the delta area. Similarly, Lake Kariba (4300 km²) in Zambia and Zimbabwe, Lake Kainja (1280 km²) in Nigeria, and Lake Volta (8500 km²) in Ghana have all become sources

Based on a lecture given at Green College, Radcliffe Observatory, Oxford OX2 6HG on 16 January 1984.

University of Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU
J K G WEBB, MA, FRCP, emeritus professor

of infection. Prevalence in children under 16 on the shores of Lake Volta has risen sharply, in some instances to 100%. Chemotherapy is available, and targeted mass chemotherapeutic programmes are the favoured method of control.

It would be easy to devote the remainder of this paper to the WHO's other selected diseases. Filariasis in its various forms affects some 300 million people. Onchocerciasis affects more than one million in the upper Volta basin alone, many thousands of whom are blind. There are 20 000 new cases of trypanosomiasis a year and 45 million people are at risk. Chagas' disease, the infection caused by *Trypanosoma cruzi* and limited to the western hemisphere, affects some 20 million people. The WHO estimates that more than 10 million people have leprosy. Less than half of these receive regular treatment, and this of course is one of the major bars to control. Resistance to dapsone, and the unsolved problem of persistence in macrophages of viable mycobacteria sensitive to drugs underlines the need for a new approach, as in malaria. The long complex journey to the development of a vaccine is therefore on here, too.

These six infections with a number of other strictly tropical diseases form part of the health burden of the Third World. It is certainly right that the WHO is coordinating work aimed at bringing these diseases under control. We can be happy that British scientists are making substantial contributions to this programme. But the fact is that these tropical diseases are not the Third World's major health problem.

Children

The main burdens of morbidity and mortality are borne by the young children of the Third World. The admirable report by Unicef (United Nations (International) Children's (Emergency) Fund), *The State of the World's Children 1984*, shows this with devastating clarity.¹ Sample data from this report are presented in Table I, which shows that at one end of the range of national development there is a low gross national product per head, a high proportion of children under 5, low life expectancy, a high crude death rate, very high birth rate, rapid population growth, and very high death rates in infants and young children; and at the other end of the range the reverse in all these variables. Countries which deviate from these trends are Saudi Arabia, where infant mortality and the proportion of young children in the population are high relative to the very high gross national product, and China and Cuba, where the reverse applies. Table II shows that deaths in children under 5 form a high percentage of all deaths in the less developed countries, and a low percentage in the most developed.

The main causes of deaths in infants and young children are malnutrition and diarrhoea, often in combination with respiratory infections, measles, and tetanus. Low birth weight, which is related to poor maternal nutrition, and short intervals between births predispose to malnutrition later in infancy. This com-

TABLE II—Deaths in children under 5 as percentages of total deaths

Malawi (1977)	India (1979)	Brazil (1980)	Cuba (1974)	USA (1978)	Japan (1980)	Sweden (1980)
80	45	28	12	3	2	1

bination of malnutrition, diarrhoea, and lower respiratory infections is found wherever infant mortality rates are high, as was the case in developed countries in the second half of the nineteenth and the early decades of the twentieth century.

New developments

The assumption that changes in this pattern in the Third World must wait for socioeconomic development has been increasingly challenged in the past 15 years. Grant in his latest Unicef report strikes a new note of optimism. The developments on which this new hope rests have taken place in three distinct but complementary spheres: community services, medical techniques, and communication and community participation.

COMMUNITY SERVICES

Community services are developing all over the Third World, as illustrated by one project in India. After independence India's plan for a health service was based on development blocks. Each block comprised a population of about 100 000 to be served by a primary health centre, staffed by a doctor and health auxiliaries, which offered a preventive as well as curative service. Even one doctor to a block required a huge increase in numbers of doctors, so India embarked on expanding medical education from the 22 medical colleges that existed in 1947 to over 100 now. Gradually the posts were filled and the establishment increased to two doctors to a block. Even so, the impact on the health of the population served was disappointing. It became clear that doctors were not trained for the part they were required to play. They had no administrative or management skills, no preparation for the supervision and support of health auxiliaries, and no experience which would help them to work with rural communities and their leaders and committees.

The Christian Medical College at Vellore saw that one way of helping to provide doctors with this training was for the college to be involved in a block health service. This was agreed with the government, and a rural unit for health and social affairs was established in K V Kuppam Block, to provide a service for the population of about 120 000. A primary health centre was already established and was developed as the base serving eight peripheral service units in the eastern half of the block. A small hospital was developed as the base serving the

TABLE I—Demographic details 1981

Country	Total population (million)	Child (0-4 years) population (million (%))	Life expectancy (years)	Gross national product/head (US\$)	Infant (0-1 years) mortality (per 1000 live births)	Child (1-4 years) mortality (per 1000 in same age group)	Crude mortality (per 1000 population)	Birth rate (per 1000 population)	Population growth rate % yearly (1970-81)
Sierra Leone	3.6	0.6 (17)	47	320	200	49	18	46	2.6
India	676.2	95.8 (14)	52	260	120	17	13	35	2.1
Saudi Arabia	9.3	1.7 (18)	55	12 600	110	17	13	45	4.5
Ghana	12.1	2.3 (19)	54	400	100	19	13	49	3.0
Indonesia	150.5	20.1 (13)	54	530	100	14	13	35	2.3
Brazil	121.5	17.1 (14)	64	2 220	80	7	8	30	2.1
Argentina	28.1	2.8 (10)	71	2 560	44	2	9	20	1.6
China	1007.8	98.0 (10)	67	300	41	7	8	21	1.5
USSR	267.7	23.4 (9)	72	4 550	26		10	19	0.9
Cuba	9.7	0.8 (8)	73	1 410	19	1	6	18	1.1
USA	229.8	18.4 (7)	75	12 820	12		9	16	1.0
UK	55.8	3.2 (6)	74	9 110	11		12	13	0.1
Japan	117.6	8.3 (7)	77	10 080	7		6	13	1.1
Sweden	8.3	0.5 (6)	77	14 870	7		11	11	0.3

eight peripheral service units in the western half of the block. In addition to doctors and nurses in the two central service units, three categories of staff were recruited and trained for the peripheral service units. Rural community organisers were selected from the thousand or more unemployed graduates in the district. Their essential role was to be the link between the local population and the project. They had to identify local leaders, learn their perception of needs, explain the intentions of the project, and plan implementation. Under the rural community organiser a health aide and family care volunteers were recruited with the help of the local community, and were trained. The health aides were literate and able to supervise the family care volunteers, many of whom were dais (traditional birth attendants) and illiterate. Mothers and children were to be the primary focus of the health programme.

A very detailed socioeconomic and health survey was carried out at the start of the project, and it was evaluated after five years. Table III shows its appreciable achievements. In addition there has been remarkable socioeconomic accomplishment, with the unit having acted as the intermediary and guarantor between local population and national banks for over 5000 loans of total value rupees 10 million (about £650 000) for agricultural, livestock, and industrial projects.

TABLE III—*The rural unit for health and social affairs 1978-83*

	1978	1983
Crude mortality (per 1000 population)	15	8
Infant (0-1 years) mortality (per 1000 live births)	116	47
Child (1-5 years) mortality (per 1000 in same age group)	23.3	11.3
Birth rate (per 1000 population)	36	24
Nutrition (by arm band measurement):		
Normal (% of population in same age group)	43	64
< 60% of normal (% of population in same age group)	26	7

The rural unit for health and social affairs shows what can be done. Although it has received substantial support and the level of staffing is more generous than can be generally replicated, it is far from unique. The college at Vellore is similarly servicing a second block. All medical colleges in India are now required to provide the health service for two or three blocks. In South East Asia the WHO has developed with national governments an integrated medical undergraduate curriculum in maternal and child health. Its adoption and implementation in Kerala State has contributed to the state's achieving the lowest infant mortality in India (45/1000). Analogous developments are taking place throughout Third World countries.

MEDICAL TECHNIQUES

The second sphere in which developments have taken place is in the application of new medical understanding to clinical practice. Oral rehydration treatment for diarrhoea, growth monitoring, immunisation, and informed education on nutrition together constitute instruments which, if wielded to their full potential, may have the most dramatic impact on infant and child morbidity and mortality. The essential science of oral rehydration treatment, growth monitoring, and nutrition education is readily converted into simple guidelines that are intelligible to village workers and therefore communicable to whole populations.

Oral rehydration treatment has proved effective in coping with the extreme challenge of cholera. Its value in dealing with the acute diarrhoea of infancy has now been shown all over the world. Ideally the solutions used include sodium chloride, sodium bicarbonate, potassium chloride, and glucose, but the simplest combination of salt and sugar in roughly appropriate proportions is remarkably effective.

The extreme forms of protein and energy malnutrition, kwashiorkor and marasmus, all start with a lag in growth. Regular weighing, and the use of a weight chart kept by the mother, make it possible for the earliest deviation from normal growth to be recognised and the appropriate corrective measures to be taken.

Education on nutrition can be exceedingly complex and sophisticated, but the essential message is simple in the extreme. Breast milk is the best infant food for a number of easily detailed reasons. Breast milk alone, however, is sufficient only for 3 to 5 months. Thereafter additional foods are necessary, and those that are available and suitable in a given locality can be readily identified and recommended.

Immunisation against diphtheria, tetanus, pertussis, poliomyelitis, measles, and tuberculosis can be made readily available, but the techniques require professional skill and are expensive (about US \$5 per child). Much is being done to simplify the technical aspects, particularly in preventing breaks in the essential cold chain. Still more is being done to use social organisations outside conventional health services and, often on a voluntary basis, to promote acceptance and increase coverage.

COMMUNITY PARTICIPATION AND COMMUNICATION

Communication and community participation are now recognised as having critical importance in both conventional community health services and the structures which are increasingly being improvised to promote health programmes. The most successful health programmes are those which communities feel to be their own, and ways of achieving this are being explored all over the Third World. At the individual level, too, full understanding is now seen as the goal. If a mother is to depart from a centuries old tradition and treat her child's diarrhoea with something as rudimentary as salt and sugar solution, a way of convincing her becomes a matter of the greatest moment. The search for the telling analogy has become a crucial element in community health expertise, and often it is the village worker, and not the professional who comes up with the answer.

Effects of new developments

The developments I have described are demonstrably making an impact. They are effecting change where change has for centuries been conspicuously inapparent. These changes pose important questions for conventional medicine. The Indian project, the rural unit for health and social affairs, is slightly atypical in the extent to which it has addressed itself to socio-economic development as well as health: 85% of those enabled to open loan accounts were living below the poverty line. The unit's activities are effecting changes not only in health but also in the structure of a rural society. The interdependence of health and social status is universally acknowledged. The extent to which it is proper for medicine to be an agent for social change is a matter on which there is less agreement.

Another aspect of these developments which raises questions is the way in which medicine is being deprofessionalised. My own view is that medical insight should be made as intelligible and as freely available as is humanly possible. This again, I suspect, is a proposition which would not enjoy universal support.

What I have been describing shows very real gleams of light in the darkness. Whether these gleams justify the hope of a "revolution for children" or "health for all by the year 2000" remains to be seen. There can, however, be no doubt about the reality of the present darkness for the world's children, and the enormity of the task involved in changing this. While still president of the World Bank Robert Macnamara believed that by the end of the century, 600 million of the world's

population would be "living at the very margin of human existence."

The gulf between south and north is so great and so unbridgable that almost inevitably one feels a sense of personal helplessness. For this reason, I shall end with a reference to Professor Ralph Dahrendorf's inaugural Arnold Goodman charity lecture, delivered in November last year. After concluding that economic growth in the future will at best be precarious, intermittent, and patchy, he argued that governments of all complexions, whether Thatcher or Mitterand, will be forced to reduce expenditure and draw back from commitments undertaken in easier times. He goes on to argue that, in the interests of freedom and justice, the voluntary sector will have to grow. He encourages us in the United Kingdom with the information that the amount of money

each person gives is 10 times that of any other country in Europe, but humbles us by telling us that giving in the United States of America is 10 times ours. Our giving, both corporate and individual, has to increase and a proportion of that giving should always be for the Third World.

I thank Unicef for permission to cite data from their report, *The State of the World's Children 1984*, published by Oxford University Press.

Reference

- ¹ Unicef. *The state of the world's children 1984*. Oxford: Oxford University Press, 1983.

Personal Paper

From chlorpromazine to NMR scans

JOHN CRAMMER

Just 30 years ago I began learning psychiatry at the Maudsley Hospital, London, in the year when chlorpromazine (Largactil) came into clinical use and opened the psychotropic age. It was not until I had finished my registrarship that the new antidepressant drugs—tricyclics, such as imipramine, amitriptyline, desipramine, and nortriptyline, and monoamine oxidase inhibitors, such as phenelzine—came out, with a burst of new clinical, pharmacological, and biochemical knowledge. This was a revolution in the treatment of psychological illness and of mental patients, and there has been nothing quite like it, nothing so dramatic, in the quarter of a century since I became a consultant. Thirty years ago we had only barbiturates as tranquillisers and electroconvulsive therapy for depression; there was morphine-hyoscine compound injection for the severely disturbed, leucotomy for chronic illness, and dynamic psychotherapy for some neurotic patients. The new drugs have all but eliminated these old treatments and have brought psychiatry into the general practitioner's surgery.

A few months ago I saw a young man from the north, who had suffered from depression for over two years. It was an effort for him to continue at work, where he thought that he was making mistakes. He avoided people, and he sat at home without interest in anything, crying at times. He had seen two general practitioners, a National Health Service psychiatrist, and a private psychiatrist, without great improvement. His sister wrote from America saying "try the Maudsley" and so he came. We get quite a few patients like this from all over the country, through relatives and friends, when local treatment seems to have failed. Some prove difficult or impossible to help. He, luckily, was easy. I gave him nortriptyline in adjusted doses and in four weeks he

was strikingly better, as confirmed by a spontaneous letter from his mother.

I like nortriptylin, and imipramine which is sedative as well as antidepressant but not too strongly so as amitriptyline sometimes is, because they are both drugs with 25 years of clinical experience and extensive scientific research behind them, and they are in my experience quite likely to work. But that means always adjusting the doses to the individual, sometimes up as high as side effects will allow, less often downwards. I give one or the other drug this full trial of different dosages over several weeks, and if it fails move to a drug of a completely different class—a monoamine oxidase inhibitor, again with a trial of rising dosage. That is, like many people, I follow a system.

The young man's doctors back home had given him mianserin and Tranxene (clorazepic acid), separately and together, Lentizol (amitriptyline), alone or with the others, lithium carbonate, trazodone, and back to mianserin. They had been prescribed in static timid doses, seemingly randomly without system, and with a preference for the relatively new and unexplored. Mianserin has been in general use for only six years or so, trazodone for half that time. It is sad that so many practitioners do not know how to use antidepressants properly. Among psychiatrists at least there is sometimes a belief that if you think carefully about what you are prescribing you will not think about the patient, that chemotherapy drives out psychotherapy. The effective treatment of depression needs both. You have to control at least some of the symptoms—if only insomnia and agitation—but you also have to make yourself credible to the patient, and you may have to treat his social setting in some way.

Need to be approachable

I have always begun by allowing a full hour for my interview with a new patient, even during the 11 years that I was a full time NHS consultant, first in Birmingham and then in Bucking-

Maudsley Hospital, London SE5 8AF

J L CRAMMER, FRCPsych, honorary consultant psychiatrist