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CONTROL OF TUBERCULOSIS IN THE WESTERN PACIFIC REGION

Control of tuberculosis was placed on the provisional agenda of the Regional Committee at the request of the Government of New Zealand. A document assessing the tuberculosis problem in the Western Pacific Region, giving guidelines for control, describing the achievements so far and the remaining problems and making recommendations for the future, has been prepared by the Secretariat.

Most developing countries or areas of the Region have developed national tuberculosis programmes, many being well integrated into the general health services, following guidelines recommended by WHO. BCG vaccination coverage of the eligible population is satisfactory. The tuberculosis mortality rate has dropped to less than one tenth of the rate in the 1950s. The infection rate among children seems to be decreasing.

However, there is no sign that the number of newly discovered bacteriologically positive cases is decreasing. Because of the chronicity of the disease, a marked decrease in incidence cannot be expected within one or two decades. Moreover, because of inadequate treatment services in some countries treatment failure and relapse with bacilli resistant to primary drugs is increasing.

Efforts need to be maintained to improve tuberculosis control programmes, particularly the quality of services, with priority being given to managerial aspects, such as training, supervision, monitoring and evaluation, and a sufficient allocation of funds. The medical profession must be convinced of the effectiveness of the standard control methods recommended by WHO, particularly case-finding by sputum microscopy for patients with respiratory symptoms and domiciliary treatment of sputum positive cases.

WHO is prepared to cooperate in programme evaluation, epidemiological and operational studies, coordination of basic and clinical research, collection and dissemination of information and training of health workers of various categories.

1. ASSESSMENT OF THE TUBERCULOSIS PROBLEM

The magnitude of the tuberculosis problem in a community is usually measured by:

- (a) the prevalence of infection;
- (b) the prevalence of the disease; and
- (c) the rate of mortality from the disease.

Of those indices, the prevalence of infection, as measured by the standard tuberculin test, is considered the most sensitive; but sensitivity is markedly influenced by the extent of BCG vaccination performed in the community.

The prevalence of the disease is of more direct relevance to case-finding and treatment programmes, but is usually difficult and costly to determine. Some countries or areas in the Region have conducted nationwide random sample surveys for the purpose.

Of the three indices, the least sensitive is the tuberculosis mortality rate. It is derived from population-based death registers, which vary widely in their degree of accuracy and completeness. In 1980, cause-of-death statistics were available for 10% of the population in the Western Pacific Region.

By consolidating scattered data gathered from countries or areas of the Region it has been possible to delineate three geographical zones showing, in the 1950s, vastly different epidemiological patterns, namely:

- (a) Countries north of the equator along the western rim of the Pacific Ocean showing generally high mortality rates, high prevalence of the disease and high prevalence of infection. This group contains about 98.2% of the 1295 million population of the Region.
- (b) Australia and New Zealand (Caucasian population), showing low mortality rates, correspondingly low morbidity rates and low prevalence of infection. This group comprises 1.4% of the total population of the Region.
- (c) The Pacific island countries or areas, including Papua New Guinea, showing low prevalence of infection, low mortality rates and low morbidity rates, and certain special features such as a high proportion of extrapulmonary tuberculosis, a relatively acute form of the disease, higher fatality in the absence of proper treatment, and generally a very favourable response to chemotherapy. This group comprises 0.4% of the total population of the Region.

2. GUIDELINES FOR THE CONTROL OF TUBERCULOSIS

The primary objective of a national tuberculosis control programme is to alleviate the disease problem as much and as rapidly as possible with the resources at hand.

WHO, in the light of practical experience in developing countries, has formulated a number of guiding principles for the organization of an effective national tuberculosis control programme, as follows:

- (1) The programme must be nationwide, as in many countries the disease is widespread in both rural and urban areas. In some Asian countries, over 80% of the population lives in rural areas. Among this group there is often a higher prevalence of infectious tuberculosis which has never been diagnosed and, as a result, response to treatment with modern drugs is usually rapid.
- (2) The programme must be planned on a long-term basis. Tuberculosis develops not only from newly infected persons but also from those who have been infected for a long time. Thus, as long as infected persons exist in the community, tuberculosis will continue to occur.
- (3) Control activities must be integrated into the general health structure. Reliance on specialized hospitals and clinics invariably leads to a patchy and spasmodic service. An integrated service, on the other hand, leads to decentralization of activities, enabling a greater number of people to benefit and a more permanent service to be maintained.
- (4) Personnel involved in primary health care, or working at peripheral health and medical institutions, must be trained for the purpose of extending control activities to every part of the country. Because those workers often have to carry out other health activities and the duration of training in tuberculosis is short, they need close supervision and periodic refresher training.
- (5) Mass application methods need to be specific, accurate, simple, time-saving, acceptable to the recipients and low in cost. Direct vaccination of young children with BCG and the use of sputum microscopy as the primary means of case-finding are good examples of such methods.
- (6) To obtain the best cooperation, priority in receiving treatment, which should be free, must be given to patients with symptoms, who are generally highly infectious but are also well motivated. Recovery of this category of patient is a very effective measure in terms of cost-benefit and at the same time ensures the protection of a large number of the population.
- (7) All the methods adopted in a national tuberculosis programme must be applicable with existing and immediately available resources. Sophisticated and expensive methods of diagnosis and treatment, which might be suitable on an individual basis, are not useful in a mass control programme.

3. ACHIEVEMENTS

3.1 Organization of a tuberculosis programme

Most of the developing countries or areas of the Region have established nationwide tuberculosis programmes, the majority of which are well integrated into the general health services.

3.2 BCG vaccination

The pace of the BCG vaccination programme has accelerated in recent years and good coverage has been achieved through:

- (a) the introduction of heat-stable freeze-dried BCG vaccine, which has been particularly beneficial in tropical areas;
- (b) direct BCG vaccination, thus eliminating pre-vaccination tuberculin testing;
- (c) simultaneous vaccination against tuberculosis and smallpox and more recently tuberculosis and DPT;
- (d) decentralization of vaccination activities, which are being carried out by the general health workers;
- (e) development of the expanded programme on immunization which ensures an adequate supply of vaccine of good quality.

During the 14 years since 1966, the average number of vaccinations performed in the Region, excluding Australia, China, Japan, and a few small areas, was approximately 5 million a year; during the previous 15 years (1951-1965) the average was only 1.6 million a year.

In most of the countries or areas where WHO collaborates in tuberculosis programmes, BCG scar surveys show that more than 80% of the population eligible for vaccination has a scar. It is considered that the vaccination programme in the Region has achieved high coverage of the eligible population.

The quality of BCG vaccination is assessed by the Mantoux test some 9 to 12 weeks after vaccination. There are still a number of countries where post-vaccination tuberculin reaction reveals the poor quality of BCG vaccination.

3.3 Case-finding and treatment

For patients with respiratory symptoms who visit general health institutions WHO recommends sputum microscopy as the case-finding method and domiciliary treatment with a standard drug regimen at the health institution nearest to the patient's residence.

The majority of developing countries or areas of the Region have now adopted this method. In many countries, the proportion of bacteriologically positive patients among newly discovered cases is more than 50%. However, in spite of the integration and decentralization of tuberculosis services, which make case-finding services available to a majority of the population, the coverage by the treatment services is still low. National prevalence surveys in Malaysia, Republic of Korea and Singapore have revealed that more than 30% of active cases have never been treated.

Treatment of tuberculosis requires the regular intake of standard chemotherapy for at least one year. The regularity and completeness of the one-year treatment varies from country to country. In some countries, complete treatment is achieved by only 30% to 40% of patients. As a result, treatment failure and relapse with bacilli resistant to the anti-tuberculosis drug, have become increasing problems.

Recently, the possibility of short-term chemotherapy (6-9 months) using rifampicin, pyrazinamide, streptomycin and isoniazid, has attracted the attention of health authorities. In Hong Kong and Singapore clinical trials have proved successful. In Malaysia, application of the regimen for 6-9 months is being tested in three states.

3.4 WHO cooperation

WHO has cooperated with Member States, through country projects and through the Regional Tuberculosis Control Team, in planning, organizing, implementing and evaluating national tuberculosis programmes and training national workers.

Shortage of trained personnel is always the greatest obstacle to the organization of such programmes. WHO has frequently been requested to provide support in the training of tuberculosis personnel, such support taking the form of seminars, refresher courses and fellowships. Two training courses in tuberculosis control are conducted in the Region, one co-sponsored by the Government of Japan and held once a year, the other co-sponsored by the South Pacific Commission and held once every five years, for medical officers in the South Pacific. Cooperation is also provided in national seminars or training courses. During the last 25 years, over 100 WHO fellowships have been awarded to key personnel in the field of tuberculosis control from almost all countries or areas of the Region. The fields of study have been epidemiology, public health administration, BCG vaccine production, bacteriology and tuberculosis nursing. A regional BCG vaccine production centre is in operation at the Serum and Vaccine Laboratories, Alabang, Philippines, supported by WHO and UNICEF.

3.5 Present status of tuberculosis in the Region

3.5.1 Tuberculosis mortality

Shortly after the Second World War tuberculosis mortality was approximately 200 per 100 000 each year in almost all countries or areas of the Region north of the equator. Since 1950, a marked reduction has been observed.

Table 1 shows tuberculosis mortality in recent years. The mortality rate in all countries or areas, except the Philippines, has decreased by more than 90%.

In Australia and New Zealand the rates, which were around 20 per 100 000 in 1950, now stand at a very low figure. However, the rate for Maori and migrants from the South Pacific is nearly 10 times higher than that for the Caucasian population. In the Philippines progress has been slow and tuberculosis still ranks as the second most serious disease in terms of mortality.

3.5.2 Prevalence of tuberculosis

National tuberculosis prevalence surveys, repeatedly carried out during the past 20 years in Japan and the Republic of Korea, have provided invaluable information on changes in the epidemiology of the disease in the two countries.

In Japan, the prevalence of radiologically active cases decreased from 3.2% in 1953 to 0.9% in 1973. In the Republic of Korea, the prevalence of radiologically active and bacteriologically positive cases decreased from 5.2% and 0.9% in 1965 to 3.3% and 0.76% in 1975.

The decrease in prevalence has been most marked in adolescent and middle-aged population groups.

Apart from a reduction in the number of tuberculosis patients, there has also been a considerable decrease in the proportion of patients suffering from advanced tuberculosis and smear positive tuberculosis.

3.5.3 Prevalence of tuberculosis infection

Table 2 shows the prevalence of tuberculosis infection in the countries or areas of the Region.

It is believed that the prevalence and incidence of tuberculosis infection have been decreasing rapidly in many countries in past years, as can be seen by the decrease in the Republic of Korea. As a result of the wide BCG vaccination coverage in most countries or areas of the Region, detailed information is not available. However, as direct BCG vaccination is being applied extensively in many countries or areas, results from tests on unvaccinated children of a specified age, obtained at regular intervals, may in future be utilized in measuring the trend in transmission of the infection.

3.5.4 Morbidity - notification of tuberculosis

Tuberculosis notification depends on the availability and effectiveness of the case-finding services. Therefore, the rate of notification does not provide accurate information on the tuberculosis problem but only a rough estimate as can be seen from Table 3.

In most of the developing countries of the Region, the number of notifications of all forms of tuberculosis, except bacteriologically positive, has decreased sharply. This is partly due to improvement in laboratory facilities but it also shows the chronic nature of tuberculosis.

As stated under 2(2) above, tuberculosis develops not only from newly infected persons, but also from those who have been infected for a long time. Thus, although the infection rate in the community may decrease, the incidence of tuberculosis will continue for a few decades.

4. REMAINING PROBLEMS

It is clear that a tremendous change has taken place in relation to tuberculosis in almost every country or area of the Region during the past 30 years. However, as stated in the previous paragraphs, tuberculosis is still a health problem and a number of constraints to implementation of control programmes still exist. These are as follows:

(1) Little attention paid to the management aspects of programmes, i.e. training, supervision and logistics. Shortage of managerial personnel at national, district and local levels and inadequate administrative support, such as provision of expenses for supervisory field visits, have been observed everywhere.

(2) Shortage of personnel for programme evaluation and operational studies.

(3) Insufficient numbers of trained personnel, inadequate funds for training, and a high turnover of health workers.

(4) Belief, still existing on the part of many medical professionals, that specialized services such as X-ray diagnosis, including mass X-ray examination, hospitalization and individually prescribed treatment, are necessary for tuberculosis control. This constitutes the largest obstacle to the full integration of tuberculosis programmes into the general health services.

(5) Lack of coordination between national programmes and the private or voluntary sector, which is usually responsible for a considerable number of tuberculosis patients. This makes supervision of treatment and follow-up of patients difficult.

These constraints have given rise to various problems:

(1) High BCG vaccination coverage has been achieved in many places but the inferior quality of vaccination, expressed in low post-vaccination allergy, has been observed in many countries or areas.

(2) Weakness in the management of programmes makes integrated programmes inefficient.

(3) Treatment of suspects revealed through X-ray consumes a large amount of drugs and places a heavy workload on health workers.

(4) Treatment failure, with drug-resistant bacilli, is becoming a serious problem in some countries.

(5) Because of lack of evaluation, many shortcomings in programmes are left uncorrected.

5. RECOMMENDATIONS

5.1 Member States should make continuous efforts to improve their tuberculosis control programmes, particularly the quality of services, priority being given to managerial aspects such as training, supervision, monitoring and evaluation. Sufficient funds should be earmarked for programme management in addition to drugs, personnel, equipment and supplies.

5.2 Further attempts should be made to convince the medical profession of the effectiveness of the standard control methods recommended by WHO, particularly case-finding by microscopic examination of patients with respiratory symptoms and domiciliary treatment of sputum positive cases.

5.3 WHO should continue to collaborate with Member States in evaluating programmes, training health workers of various categories, carrying out epidemiological and operational studies and disseminating information.

Table 1. Tuberculosis mortality

<u>Country or area</u>	<u>Year</u>	<u>Mortality/100 000</u>
Australia	1977	0.7
Hong Kong	1978	9.1
Japan	1979	7.2
New Zealand	1976	2.0
Philippines	1976	71.8
Singapore	1978	13.6

Table 2. Prevalence of tuberculosis infection:
tuberculin positive rate

Country or area	Year	Age group			
		0-4	5-9	10-14	15+
Malaysia	1976-77	3.4	4.5	15.4	52.5
Republic of Korea	1965	10.2	33.7	69.5	81.4
	1970	8.5	26.1	54.1	82.3
	1975	4.8	15.9	49.6	83.1
Singapore	1978	4.0*	-	-	-
American Samoa	1976	0.6	1.2	3.5	36.2
New Hebrides	1964-67	1.8	7.6	17.5	54.3
Papua New Guinea (coastal area)	1974	-	5.0	-	-
Samoa	1975	1.2	2.6	16.2	-
Tonga	1967-70	2.3	5.3	13.4	54.7

*Estimated from the rate at school entrance.

Tuberculin used : PPD RT 23 Tween 80 1 TU
Positive reaction: 10 mm or larger induration

Table 3. Notification of tuberculosis patients
(per 100 000 population)

<u>Country or area</u>	<u>Year</u>	<u>All forms of tuberculosis</u>	<u>Bacteriologically positive</u>
Australia	1978	9.1	
New Zealand - Total population -	1977	19.6	
Maori	1977	74.9	
Non-Maori	1977	14.3	
Hong Kong	1978	143.8	
Japan	1979	70.2	
Malaysia (Peninsular)	1978	63.5	42.2
Republic of Korea	1978	220.7	88.9
Singapore	1978	120.0	45.3
Samoa	1978	32.7 (new)	19.3 (new)
	1978	17.3 (relapse)	16.0 (relapse)
Tonga	1975-77	75.0	26.5
New Hebrides	1975-76	178.8	57.6
Papua New Guinea	1978	77.3	32.4
Solomon Islands	1977-79	190.3	72.9